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A

SYNOPSIS

OF

THE LICHENES

...THE OTHER NORTHERN STATES,

Mr. John Macoun
Belleville
Ontario

ROYAL BOTANICAL SOCIETY OF RATISBON.

CAMBRIDGE:
GEORGE NICHOLS,
BOOKSELLER TO THE UNIVERSITY.
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A

SYNOPSIS

OF

THE LICHENES

OF NEW ENGLAND, THE OTHER NORTHERN STATES, AND BRITISH AMERICA.

BY EDWARD TUCKERMAN, A.M.

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PREFACE.

THE study of any group of plants, with a view to the true relations of the species brought together in it, and their real history, requires the investigation of a great number of individual states, and this often through a series of years. And there is, perhaps, no family of plants in which extensive and continuous observation is more important than in the *Lichenes*. The present work is prepared, therefore, only as an Index and Introduction to the history of the plants described in it; and it has been my object rather to state results of foreign study, than to offer the necessarily imperfect conclusions of my own limited research. Use has constantly been made of the *Lichenographia Europæa Reformata* of FRIES, whose characters of the sections and genera I have, for the most part, adopted entire, or with only occasional amplification; and the profound descriptions of the *Lichenographia*, as here applied to our species, constitute almost the whole descriptive value of the present enumeration. The exceptions to this will, I hope, meet with the indulgence which the extreme difficulty of any inquiries in a field as much neglected as this has been, among us, seems to demand.*

* The later works of Fries have also been consulted, and, beside these, principally those of Turner & Borrer, Eschweiler, and Schærer, and, for American

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The geographical limits of the work include the countries generally north of 40° N. lat.; but only occasional reference has been made to those regions of Arctic America which do not belong to the British possessions, and I have had, also, less regard to the extreme southern boundary, which is everywhere characterized by the appearance of southern species. The greater, or more northern, portion of this district is naturally distinct and similar throughout, and its Lichenose vegetation seems, indeed, almost represented by that of New England alone. It is probable, however, that a large proportion of the species inhabiting any part of the district, if we except its southwestern extremity, are described here.

For the particular citations of New York Lichens, my principal authorities have been the *Catalogue of the Plants of New York* of Dr. Torrey, 1819, and the *Synoptical View of the Lichens of New York* by Mr. Halsey, 1824. For citations of species from Pennsylvania, &c., besides Dillenius (as revised in Fries's *Index Dillenianus*) I have been almost wholly indebted to the *Catalogue of the Plants of North America* of Muhlenberg, 1818, and his specimens now existing in that part of the herbarium of Acharius which is at Upsal, as well as in the herbaria of Willdenow and Floerke at Berlin. For the Canadian and Newfoundland Lichens, I have availed myself of those described in the *Flora* of Michaux, as compared with the specimens in his herbarium at Paris, the species enumerated by Mr. De la Pylaie in his *Voyage a l'Ile*

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species chiefly, the *Synopsis* and the *Lichenographia* of Acharius. The terminology is wholly that of Fries, and its peculiarity will be found mostly to consist in a strict etymological use of the whole force of the terms he employs. These terms are, then, possibly, the best expressions of the knowledge they contain, and, in this view, as well worth studying as any other part of systematic science, the design of which is to teach, not current names for its objects, but their history.

de Terre-Neuve, and the specimens of those collected by him, Mr. Despreaux, and others, preserved in the Royal Herbarium at Berlin, in that of Professor Kunth, and in those of the late Baron Delessert and of Dr. Montagne, at Paris. To the vast herbarium of Sir W. J. Hooker I am indebted, not only for numerous Lichens of Canada and Newfoundland, but for a large collection of the arctic species obtained in the different voyages of Parry, Franklin, and others; and to these, and his various Enumerations, together with those of Mr. Brown, Sir John Richardson, and Dr. Greville, I owe most of the arctic citations. The late venerable Mr. Menzies also favoured me with a nearly entire set of the Lichens collected by him on the Northwest Coast of America.

The genera separated from *Lichenes* by Fries, and referred to his family *Byssaceæ*, have not yet been fully studied in this country; but these plants are so closely related to *Lichenes*, that I have enumerated our ascertained species, as an appendix, at the end.

The present occasion does not permit me to offer more than general acknowledgments to the eminent botanists whose kind consideration has encouraged the progress of this work. But I cannot conclude it without expressing my indebtedness to the great kindness and liberality of Sir W. J. Hooker, and of William Borrer, Esq., the learned lichenographer of Britain; to my much respected friend, Dr. Klotzsch of Berlin, without whose liberal assistance in the study of the Floerkean herbarium it could not have been undertaken; and to my esteemed friend Dr. Gray, at whose instance it has been prepared.

CAMBRIDGE, *4th February*, 1848.

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LICHENES.

Perennial, aerial Algæ, vegetating only under the influence of moisture, which is imbibed by the whole surface, propagated by spores (*sporidia*), and also by the cells (*gonidia*) of the green layer.

Thallus (universal receptacle, *Ach.*) composed of three layers, viz.: the *cortical*, the *medullary*, and the *gonimous;* evolved from a *hypothallus* (the elementary state in which the layers are confused, and discernible afterwards as cylindrical cells, and also as fibres on the under side of foliaceous Lichenes, and forming the base, closely adnate to the matrix, in crustaceous ones), typically horizontal or vertical. The horizontal thallus is either *crustaceous* (often somewhat lobed at the circumference or squamulose), or *foliaceous* (becoming sometimes in degenerate states crustaceous). The vertical thallus is either compressed (*subfoliaceous*), or terete (*fruticulose*); of both of which the *filamentous* thallus and the *pendulous* thallus are degenerations. In Cladonia and Stereocaulon a vertical thallus (*podetium*) arises from the primary horizontal thallus, and is itself often besprinkled with a kind of secondary horizontal thallus in the form of leaf-like scales. — Lichenes are reproduced in two ways; 1. by *gonidia*, the (normally green) cells of the green (gonimous) layer, which appear on the surface as irregularly shaped powdery masses (*soredia*), and propagate either on the original thallus, forming foliaceous or squamulose expansions, or external to the original thallus, forming new individuals of the parent thallus; and 2. by *sporidia*, consisting of subglobose or elliptical cells, which are either naked or contained in other elongated more or less vertical cells (*asci*), and immersed in the *thalamium* (or fructification proper), and propagate new individ-

uals of the species. The thalamium is either rounded, gelatinous-waxy, and the asci converging (*nucleiform*); or flattened at length into a rigid, persistent, or afterwards collapsing lamina (*subdisciform*); or originally disciform (*open*); and is itself contained in a receptacle (*exciple*), either of the same color with and like the thallus (*thalline exciple*), or of different color and nature (*proper exciple*). The whole fructification constitutes the *apothecium*, which is typically round, though also occurring normally oblong and linear (*lirellæform*), and is either excavated with a contracted margin (*urceolate*); or slightly concave with an elevated margin (*scutelliform*); or very concave-scutelliform (*cyathiform*); or very concave-scutelliform and pervious (*infundibuliform*, a term applied also to the pervious cup-bearing podetia of Cladoniæ); or goblet-shaped and stipitate (*crateriform*); or dilated, flat, and without prominent margin (*peltæform*, of which the *reniform* is a variation); or convex with repressed margin (*cephaloid*); or between scutelliform and peltæform (*disciform*); or between scutelliform and cephaloid (*tuberculate*). When the thalline exciple is prolonged below into a footstalk, it is said to be *pedicellate;* a proper exciple in like manner prolonged is said to be *stipitate*. When the proper exciple is originally and typically closed, the apothecium receives the name of *perithecium*. In the Angiocarpi several thalamia are sometimes contained in the same exciple (*composite apothecia*); and in the Gymnocarpi, in like manner, several disks are sometimes confluent (*symphycarpeous apothecia*). The colors of the thallus in Lichenes are disposed by Fries in four series: — 1. from pale green becoming *glaucous;* 2. from yellowish green becoming *ochroleucous;* 3. from dark green becoming *fuscous* or *olivaceous;* 4. from pale yellow-green becoming *lemon-colored*. Each series has its peculiar variations. The glaucous runs into pale green, cerulescent, and white; the fuscous into dark green, olivaceous, cinereous, grayish-fuscous, and dark chestnut; the ochroleucous into yellowish green and albescent; the lemon-colored into pale yellow, orange-red, and vermilion-red.

Synopsis of the Genera.

Div. I. GYMNOCARPI, Schrader, Fries.

Apothecia open, disciferous. Thalamium originally disciform, or becoming so, contained in a thalline exciple or a proper exciple; disk normally persistent, ascigerous; sometimes originally pulveraceous-collapsed.

Tribe I. PARMELIACEÆ, Fr. — Apothecia rounded, from concave becoming explanate, scutelliform, rarely peltate. Disk somewhat waxy, persistent, contained in a thalline exciple.

Subtribe 1. Usneeæ, Eschw. — Disk open. Thallus subvertical, or pendulous-sarmentose, centripetal, without apparent hypothallus.

1. Usnea. Apothecia peltate; thallus with a solid medullary layer.
2. Evernia. Apothecia scutelliform; thallus fistulous, or with a cottony medullary layer.
3. Ramalina. Apothecia orbiculate-subpeltate; disk pale, of nearly the same color with the thallus.
4. Cetraria. Apothecia scutellate-peltate, oblique.

Subtribe 2. Parmelieæ, Eschw. — Disk at first closed, becoming at length discoid-open. Thallus horizontal, centrifugal, with a hypothallus.

5. Nephroma. Apothecia reniform, adnate to the lobes beneath.
6. Peltigera. Apothecia peltæform, adnate to the upper side of the elongated lobes.
7. Solorina. Apothecia adnate to the disk of the thallus.
8. Sticta. Apothecia scutelliform; thallus with cyphellæ, or discolored spots, on the under side.
9. Parmelia. Apothecia scutelliform; thallus without veins or cyphellæ beneath.
10. Thelotrema. Apothecia urceolate-scutelliform, a discrete interior exciple veiling a rigescent disk.
11. Gyalecta. Apothecia urceolate, an elevated and discrete colored margin bordering a nigrescent disk.

Tribe II. LECIDEACEÆ, Fr. Apothecia rounded, a persistent disk contained in an open proper exciple, which it finally covers, and becomes convex, cephaloid, and immarginate.

12. STEREOCAULON. Apothecia cephaloid; podetia mostly solid.
13. CLADONIA. Apothecia inflated; podetia fistulous.
14. BÆOMYCES. Apothecia capitate, globose, immarginate, velate.
15. BIATORA. Apothecia disciform, solid, with a waxy (originall paler) exciple.
16. LECIDEA. Apothecia disciform, solid, with a carbonaceous, blac proper exciple.

Tribe III. GRAPHIDACEÆ, Fr. — Apothecia of various form an altered thalline carbonaceous proper exciple, or an originall proper exciple margining a gyrose and proliferous-papillate, o canaliculate disk.

17. UMBILICARIA. Apothecia orbiculate or lirellæform; thallus folia ceous.
18. OPEGRAPHA. Apothecia lirellæform; thallus crustaceous.
19. LECANACTIS. Apothecia irregular, at first open, with a pruinos thalline veil.

Tribe IV. CALICIACEÆ, Fr. — Apothecia orbiculate or globos always open, margined by a proper exciple, the disk collaps ing into naked sporidia; or immarginate, and the sporidia ca pituliform-compact.

20. TRACHYLIA. Apothecia sessile, innate; disk ascigerous.
21. CALICIUM. Apothecia crateriform, marginate.
22. CONIOCYBE. Apothecia stipitate, immarginate.

Div. II. ANGIOCARPI, Schrader, Fries.

Apothecia closed, nucleiferous, pertuse and with an ostiole, or irreg ularly dehiscent; the nucleus included, subglobose, ascigerous.

Tribe I. SPHÆROPHORACEÆ, Fr. — Apothecia formed of th intumescent apices of the thallus, closed, at length irregularl lacerate-dehiscent. Nucleus subglobose. Thallus vertical, fru ticulose.

23. SPHÆROPHORON. Apothecia terminal, spherical; nucleus black

Tribe II. ENDOCARPACEÆ, Fr. — Apothecia immersed in th thallus, globose, the thalline exciple attenuated into a neck, an terminated by a discrete heterogeneous papillæform ostiol Nucleus deliquescent. Thallus horizontal, foliaceous or crus taceous.

24. ENDOCARPON. Apothecia pale, included in the foliaceous thallus.
25. SAGEDIA. Apothecia blackish, immersed in the crustaceous thallus.
26. PERTUSARIA. Apothecia verrucæform, with one or more blackish, papillate ostioles.

Tribe III. VERRUCARIACEÆ, Fr. — Apothecia rounded, a closed proper exciple (perithecium) becoming pertuse with an ostiole, or at length open. Nucleus gelatinous, subhyaline, deliquescent. Thallus crustaceous.

27. CONOTREMA. Perithecia at length open; nucleus subdisciform.
28. VERRUCARIA. Perithecia closed, with a papillæform or simply pertuse ostiole.

Tribe IV. LIMBORIACEÆ, Fr. — Apothecia rounded, the carbonaceous proper exciple closed, at length variously dehiscent. Nucleus subceraceous, rigescent. Thallus crustaceous.

29. PYRENOTHEA. Perithecia at length pertuse, protruding the fatiscent nucleus.

DIV. I. GYMNOCARPI, Schrad., Fr.

Tribe I. PARMELIACEÆ, Fr.

I. USNEA, Dill., Hoffm.

Apothecia rounded, peltate, subterminal; disk open, placed upon the filamentous medullary stratum, the margin mostly radiate-ciliate. Thallus cartilagineous, at first erect, suffruticulose, becoming with age more or less filamentous or pendulous, the crustaceous cortical stratum somewhat separate from the medullary.

A genus universally diffused; and the first species occurring, in one or other of its forms, in every quarter of the globe. This species extends throughout the United States. *U. homalea*, Tuckerm. Enum. 1845, with a softish, much compressed, ancipital, rugulose, fastigiate and attenuate-branched thallus, and plane apothecia, with scarcely elevated, obtuse margins, *Ramalina homalea*, *Ach. Lich. p.* 598, was discovered on the coast of California by *Menzies!* but has not been detected elsewhere.

1. U. *barbata*, Fr. Thallus terete, irregularly branched, at length annulate-cracked, glaucous; apothecia almost immarginate, radiate disk pale. *Fr. Lichenogr. p.* 18. — *α florida*, Fr.; very much branched somewhat scabrous; apoth. large. *U. florida, Ach.* — *β. strigosa*, Ach.: rather small, very thickly fibrillose-strigose. *Ach. Syn. p.* 305. — *γ. rubiginea*, Michx.; lax, scabrous, more or less rusty-red. *U. florida, var rubiginea, Michx. Fl.* 2, *p.* 332. — *δ. hirta*, Fr.; very much branched dwarfish, the fibrillæ somewhat elongated, oftener verrucose-pulverulent. *U. hirta, Hoffm.* — *ε. plicata*, Fr.; pendulous, elongated, subdichotomous, entangled, lax, smoothish, pale. *U. plicata, Ach.* — *ζ. dasypoga*, Fr.; pendulous, elongated, branches somewhat simple, lateral fibres spreading. *U. barbata, Hoffm. Lichen barbatus, L.*

Very common; *α*, *β*, *ε*, and *ζ* mostly on trees, the last two less frequently fertile; *δ* on rails, sterile; New England. New York, *Torrey*. Pennsylvania, *Muhl.* Northward to Arctic America, *Richardson* (Franklin's Narrative, App.).

2. U. *longissima*, Ach. Th. pendulous, filamentous, terete-compressed, somewhat rugulose, smoothish, nearly simple, pale glaucous, with approximate, horizontal, at length tortuous fibres. *Ach. Syn. p.* 307.

Firs and other trees on the sides, and in swamps at the base, of the high mountains of New England, and northward, occurring 5 feet long. Infertile, as is also the case with the European Lichen on which the species was founded. It seems, like the last species, to be very widely diffused; and I have, or have seen, specimens probably belonging to it, from Europe, Asia, Africa, and New Holland. A single Cape of Good Hope specimen, in my possession, is fertile, and has quite concave, radiate apothecia, with somewhat elevated, obtuse margins. The earliest specimen that I have seen is an infertile one in the Berlin herbarium, collected in Cappadocia by Tournefort.

3. U. *angulata*, Ach. Th. pendulous, flexuous, angular, nearly simple, pale cinerascent; angles acute, scabrous; fibres horizontal, approximate, simple, short, terete-attenuate. *Ach. Syn. p.* 307. *Halsey, Synopt. View, in Ann. N. Y. Lyc.* 1, *p.* 21.

Trees, Pennsylvania, *Muhl.! Ach.* New York, *Torrey*. Massachusetts, occurring 4 feet long, *Halsey*. Spruce swamps, Chelmsford, *Russell!*

1. U. *trichodea*, Ach. Th. pendulous (prostrate), very delicate

and flexile, filiform, smooth, somewhat branched, whitish-pallescent; fibres horizontal, scattered, rather secund, flexuous; apoth. small, with an elevated, thin, entire margin. *Ach. Syn. p.* 307. Icon, *Ach. Meth.*, *t.* 8, *f.* 1.

Nova Scotia, *Menzies*, fide Ach. Canada, *Herb. Michaux!* The specimen in herb. Floerk.! which Floerke supposed might be U. trichodea, Ach., is referred by him to U. plicata.

5. U. *sphacelata*, R. Br. Th. erectish, fruticulose, the principal branches ochroleucous, black-vittate, smooth, the ultimate ones attenuate, black, all sorediiferous. *R. Br. Suppl. to Parry's Voy. p.* 307.

Melville Island, *R. Br.* I have not seen American specimens, but I have received fine ones from Dr. Vahl, collected by him in Spitzbergen.

II. EVERNIA, Ach., Fr.

Apothecia rounded, scutelliform, marginal; disk open, placed upon the cottony medullary layer, colored. Thallus originally erect, teretish-fruticulose or compressed-foliaceous (abnormally filamentous or pendulous), within uniform, and either fistulous, or filled with the cottony medullary layer.

The third section of this genus (Physcia) is further represented in the South of Europe by three species not as yet known with us: — *E. intricata*, Fr., with a much-branched, linear, glaucous thallus; *E. villosa*, Fr., with a villous, multifid, glaucous thallus; and *E. flavicans*, Fr., with a much branched, linear, bright yellow thallus; of which the first and last species attain to the southern coast of England (Borrer); the first two are found in the Canary Islands (Montagne); the second in Peru (Acharius); and the last in the West Indies (Ach.) and South America (Eschweiler). It is possible that one or more of these species may occur in the Southern States. In the North, *E. divaricata*, Ach., nearest to E. prunastri, with a more or less filamentous, softish, lacunose thallus, is the only European Lichen of the present section that is wanting with us.

§ I. *Corniculariæ*, Fr. Fruticulose, passing into filamentous or pendulous forms.

1. E. *furcellata*, Fr., with long (terete-compressed?) di-trichotomously divided, suberect, entangled branches, from hoary becoming cinereous, or slightly greenish, with furcate fuscous apices, *Dill. Musc. t.* 85,

f. 14, was constituted on a Lichen which Fries referred to this figure and description of Dillenius, whose own specimens were sent him from Pennsylvania, by *J. Bartram*. I have not seen Fries's description, but he says incidentally (Lichenogr. p. 478) that his specimens are (like those of Dillenius) infertile, and that the genus of the Lichen is therefore doubtful.

2. E. *jubata*, Fr. Thallus terete, smooth, much branched, black-fuscous (or palish), apices simple; apothecia innate-sessile, entire, of the same color with the thallus. *Fr. Lichenogr. p.* 20. — *α. bicolor*, Fr.; th. erectish, fruticulose, branches divergent, apices cinereous-fuscescent. *Cornicularia bicolor*, *Ach.* — *β. chalybeiformis*, Ach.; th. subfilamentous, decumbent, somewhat rigid, divergent (often white-sorediiferous), apices oftener palish. *Alectoria jubata*, *var. chalyb.*, *Ach. Cornicularia fibrillosa*, *Halsey*, *Lich. N. Y. l. c. non Ach.* — *γ. implexa*, Fr.; th. filamentous, pendulous, very much branched, entangled, softish, apices of the same color. *Lichen jubatus*, *L.* — *δ. setacea*, Ach.; th. filamentous, rather slender, very long, pendulous, somewhat simple, frequently sorediiferous. *Alect. jubata*, *var. setacea*, *Ach. Setaria trichodes*, *Michx. Alect. trichodes*, *Pylaie Voy. p.* 17.

Very common: *α*, trees on high mountains, fertile; and on the ground in alpine districts, infertile; White Mountains. Arctic America, *R. Br.* (Ross's Voy.). — *β*, old rails, stones, and trees, sterile; common in New England. Arctic America, *R. Br.* (Scoresby's Arc. Regions), *Rich.* — *γ*, trees in mountainous and subalpine districts, infertile; New England and westward. Arctic America, *Rich.* — *δ*, dead wood, Canada, *Michaux!* Newfoundland and northward, *Herb. Hook.* Michaux's Lichen is extremely delicate, but apparently not distinct.

3. E. *divergens*, Fr. Th. somewhat angular, dark-chestnut, white-dotted; branches elongated, flexuous; apices attenuated, forked, of the same color; apoth. innate-sessile, crenulate, disk of the same color. *Fr. Lichenogr. p.* 21. *Cornicularia*, *Ach.*

On the earth, alpine and arctic regions. Newfoundland, *Herb. Dessert.* Bear Lake, *Rich.*, *Hook.!* (Parry's Sec. Voy.).

4. E. *ochroleuca*, Fr. Th. teretish, smoothish, ochroleucous (and palish), axils compressed-sublacunose, irregularly branched, apices attenuate, subfibrillose; apoth. innate-sessile, at length repand, disk livid-fuscous. *Fr. Lichenogr. p.* 22. — *α. rigida*, Fr.; th. suberect, fruticulose, rigid, ochroleucous, apices reflexed, blackish. *Cornic. ochro-*

leuca, Ach. — *β. sarmentosa*, Fr.; th. filamentous, sarmentose-pendulous, much branched, softish, ochroleucous or pale, apices elongated, of the same color. *Alectoria sarmentosa, Ach.*

Mountainous, alpine, and arctic regions. — *α*, on the earth; White Mountains, infertile. Arctic America, *Rich.* (Herb. Hook. !), *R. Br.* (Parry's First Voy.), fertile. — *β*, on the trunks and branches of trees in the mountains of New England, and northward, fertile; and on the earth, alpine and arctic, sterile. *α* does not seem to be well represented on our mountains. The arctic specimens are very fine.

5. E. *vulpina*, Ach. Th. much branched, rigid, angular, compressed-lacunose, greenish-yellow; apoth. sessile, disk fuscous. *Fr. Lichenogr. p.* 23.

Trunks and rails, N. W. America, *Menzies!* and Rocky Mountains, *Herb. Hook.!* fertile. A few specimens in my possession, from the White Mountains, and elsewhere, may belong to this; but most of the degenerate plants commonly referred to it here are, perhaps, as safely placed with E. prunastri.

§ II. *Dufourea*, Fr. Fruticulose, inflated, apothecia terminal.

6. E. *ramulosa*, Hook. (sub Dufourea). Th. cæspitose, terete-compressed, scarcely lacunose, fuscous-glaucescent, much branched and fuscous-olivaceous above, branches subdichotomous, tuberculate-ramulose, obtusish. *Dufourea ramulosa, Hook. App. to Parry's Sec. Voy. p.* 424.

Arctic America, *Hook.* Considered by Hooker nearest to E. madreporiformis, from which he remarks that it differs in color, in its branching, and in being fistulous.

7. E. *arctica*, Rich. (sub Dufourea). Th. somewhat cæspitose, subsimple, or with a few short branches above, subulate-ventricose, smooth, sulphureous becoming brownish; apoth. chestnut, with an obscure, crenulate thalline margin. *Dufourea arctica, Rich. in Frankl. Narr. p.* 762 & Icon, *t.* 31.

Bear Lake, and elsewhere in Arctic America, *Rich.* (herb. Hook.!). I follow Fries in considering the Dufoureæ a section of the present genus. Hooker (App. to Parry's Sec. Voy. l. c.) refers Dufourea nodosa, R. Br. (Ross's Voyage), to a variety of the present species. I have not seen the description of Brown.

§ III. *Physcia*, Fr. Foliaceous-compressed, the under side channelled.

8. E. *prunastri*, Ach. Th. subfoliaceous, ochroleucous (and pallescent), laciniæ linear-attenuate, rugose-lacunose; on the under side somewhat channelled and white; apoth. subpedicellate, cyathiform, rufous. *Fr. Lichenogr. p.* 25.

Trees and shrubs, more rarely on stones and rails. Arctic America, *Rich.* Canada, fertile, *Herb. Hook.!* More common with us in degenerate states. New England. New York, *Torr.* Pennsylvania, *Muhl.*

9. E. *furfuracea*, Mann. Th. subfoliaceous, glaucous (oftener cinereous-furfuraceous), laciniæ linear, dichotomous; channelled and becoming black on the under side; apoth. pedicellate, disk rufescent. *Fr. Lichenogr. p.* 26. *Borrera, Ach.* — *β. Cladonia*, Tuckerm.; suffruticulose, naked, laciniæ patent, much branched, and often somewhat thyrsoid-entangled.

Trunks, common and fertile; more rarely on stones, &c.; New England. New York, *Halsey.* — *β*, firs and other trees, on the mountains of Northern New England, fertile.

III. RAMALINA, Ach.

Apothecia rounded, scutelliform, thick, pedicellate-subpeltate, scattered upon both sides of the thallus, disk open, placed upon the (green) gonimous stratum. Thallus originally erect, ramose-laciniate, similar throughout, and of the same color.

Two species occurring in the North of Europe are as yet wholly wanting with us: — *R. pollinaria*, Ach., with a softish, flaccid, corrugated thallus besprinkled with white powdery spots; and *R. scopulorum*, Ach., with a thick, rigid, polished, often terete thallus, attaining to a very large size. At the extreme South, we may possibly have some West Indian species, or others peculiar to this continent. The late Mr. Menzies kindly presented me with two, collected by him on the coast of the Mexican State of California, which may be noticed briefly in this place. It is probable the first, at least, has been already described, but I have not been able to find any account of it. *R. retiformis*, Menz. herb.; subcartilagineous, much elongated, the irregular flexuous branches dilated above and regularly reticulate-perforate; apoth. lateral. Monterey! — *R. Menziesii*, Tuckerm.; submembranaceous, thin, deeply lacunose or plane, canaliculate, smooth; apoth. lateral, sessile, with a thin, elevated margin. *R. scopulorum? Menz. herb. R. scopulorum, var. tenuissima, Hook. & Arn. in Beechey's Voy.*

p. 163? Monterey! Appears to me to differ from R. scopulorum in its softish, plane, often deeply lacunose, and thin thallus, as well as in the apothecia. — ROCCELLA, a genus nearly allied to the present and the last, and diffused throughout the warmer regions of the globe, has not as yet any North American representative. I saw, however, in a small collection of "Algæ from Carolina, Bermudas, and the Caribbees, by the Rev. Mr. Clerk," in the British Museum, a Roccella, which resembled R. phycopsis, Ach.; but it is uncertain at which of the above localities this Lichen was obtained.

1. R. *calicaris*, Fr. Thallus ramose-foliaceous, cartilagineous, rigescent, lacunose, glaucous; apothecia pedicellate, with elevated margins, disk plane, palish. *Fr. Lichenogr.*, *p.* 30. — *α. fraxinea*, Fr.; laciniæ longer and broader, the fertile ones plane; apoth. lateral. *R. fraxinea, Ach.* — *β. fastigiata*, Fr.; laciniæ shorter, fastigiate, subcompressed, lacunose; apoth. somewhat terminal. *R. fastigiata, Ach.* — *γ. canaliculata*, Fr.; laciniæ sublinear, narrow-attenuate, fertile ones channelled; apoth. affixed to the reflexed apices. *Lichen calicaris, L. R. fastigiata, β., Ach.* — *δ. farinacea*, Schær.; laciniæ linear-attenuate, sublacunose (sorediiferous), rigid; apoth. scattered. *R. farinacea, Ach.*

Very common: *α*, *β*, and *γ*, on trees, rails, &c.; the last especially in mountain forests; *δ*, abundant in the New England mountains, and northward, on trees and rocks. New York, *Torrey*. Pennsylvania, *Muhl.*

2. R. *polymorpha*, Ach. Th. cæspitose, cartilagineous-rigid, longitudinally costate-rugose, glaucous (and pallescent), often sorediiferous and the soredia capituliform; apoth. subterminal, pedicellate, with elevated margins, disk concave, pale. *Fr. Lichenogr. p.* 32. — *β. tinctoria*, Ach.; laciniæ sublinear, diffuse, linear-lacunose, lacerate-incised and pulverulent at the apices. *Ach. Lichenogr. p.* 601.

Rocks and stones, fertile; New England, and westward, very common. New York, *Halsey*. Pennsylvania, *Muhl.* Arctic America, *Rich.*

IV. CETRARIA, Ach., Fr.

Apothecia scutellate-peltate, affixed obliquely to the apices of the thallus. Thallus cartilagineous-membranaceous, originally ascendant; smoothish on the under side; lobes either somewhat terete, or foliaceous and somewhat concave above.

All the European species, and indeed all that belong to the genus (as revised by Fries) in the last general work of Acharius (Synopsis), occur with us, with several others. It is difficult to define strictly the limits between the foliaceous species of Cetraria and some Parmeliæ of the subsection Imbricaria; and in his Flora Scanica, Fries has suggested the possibility of extending Cetraria to include most or all of the Imbricariæ. But the genus, as limited in the Lichenographia Europæa, seems a natural one, and well distinguished from Parmelia.

§ 1. *Cartilagineæ*, Fr. Thallus cartilagineous, suberect.

1. C. *tristis*, Fr. Thallus fruticulose, horny-cartilagineous, rigid, solid, distichally dichotomous, pitch-black, branches fastigiate, terete; apothecia terminal, plano-convex, disk fuscous-black. *Fr. Lichenogr. p.* 34. *Cornicularia*, *Ach.*

Alpine and arctic rocks. Arctic America, *Rich.*

2. C. *odontella*, Ach. Th. fruticulose, rigid, solid, subcompressed, palmate-ramose, dark-brownish-chestnut, branches plane, dentate (not ciliate-spinulose); apoth. terminal, plane, disk fuscous. *Fr. Lichenogr. p.* 35.

Stones and moist rocks in alpine districts. Newfoundland, *Despreaux* in herb. Deless.! *Bory* in herb. Kunth! fertile. Northward to Arctic America, *Herb. Hook.!* Melville Island, *R. Br.* (Parry's First Voy.).

3. C. *aculeata*, Fr. Th. fruticulose, rigid, subfistulous, lacunose-compressed, very much and irregularly branched, dark-brownish-chestnut, branches divaricate, black-spinulose; apoth. terminal, peltate, denticulate, disk of the same color. *Fr. Lichenogr. p.* 35. *Cornicularia Ach.*

On the earth in alpine and subalpine districts. White Mountains fertile. Northward to Arctic America, *R. Br.*, *Hook.!*

4. C. *Richardsonii*, Hook. Th. subfoliaceous, canaliculate, divaricate-bipinnatifid, naked or sparingly black-denticulate, dark-chestnut; apoth. marginal, subpedicellate, margin granulate or irregular, disk yellowish-brown. *Hook. in Frankl. Narr. p.* 761, & Icon, *t.* 31.

Barren grounds north of Great Slave Lake, *Rich.* (herb. Hook.! & herb. Grev.!). Prostrate.

5. C. *Islandica*, Ach. Th. subfoliaceous, sublinear, canaliculate, ciliate-spinulose, olivaceous-chestnut; apoth. obliquely scutellate, adnate to the upper side of the lobes, very entire, disk dark-chestnut

Fr. Lichenogr. p. 36. — *β. platyna*, Fr.; laciniæ broader, flattish, waved. *Fr. l. c.* — *γ. crispa*, Ach.; laciniæ narrow, crisped, with connivent margins. *Fr. l. c.*

On the earth in alpine and subalpine districts, and at lower elevations northward, abundant and fertile; *γ* not found elsewhere. Also degenerate and sterile on hill-sides, and in sandy fields near the coast, throughout New England. New York, *Torrey*. Pennsylvania, *Muhl.*

6. C. *cucullata*, Ach. Th. subfoliaceous, sinuate-laciniate, ochroleucous, sanguineous-fuscous at the base, margins connivent and waved; apoth. adnate to the under side of the lobes, disk pale-flesh-colored. *Fr. Lichenogr. p.* 37.

On the earth in alpine and subalpine districts. White Mountains, fertile. Northward to Arctic America, *Rich.*

7. C. *nivalis*, Ach. Th. foliaceous, erectish, lacunose-reticulate, lacerate-laciniate, ochroleucous, yellowish at the base; laciniæ canaliculate-patulous, crisped; apoth. marginal, crenulate, yellowish-flesh-colored. *Fr. Lichenogr. p.* 38.

On the earth in alpine and subalpine districts. White Mountains, fertile. Northward to Arctic America, *R. Br.* (Scoresby).

§ II. *Membranaceæ*, Fr. Thallus coriaceous-membranaceous, the sterile fronds subdepressed.

8. C. *glauca*, Ach. Th. membranaceous, foliaceous, expanded, sinuate-lobed, ascendant, glaucous (and cinerascent); becoming black on the under side; apoth. terminal, peltate, dark-reddish-chestnut. *Fr. Lichenogr. p.* 38. — *α. fertilis*, Fr.; laciniæ elongated, channelled, becoming whitish on both sides, or spotted with white. *Fr. l. c.* — *β. sterilis*, Fr.; laciniæ shorter, wider, subdepressed, the under side fuscous-black. *Fr. l. c.*

Trunks of trees, stones, &c., in mountain forests, and elsewhere; New England. Northward to Newfoundland, *Pylaie.*

9. C. *sepincola*, Ach. Th. membranaceous, foliaceous, ascendant, laciniate, from green becoming olivaceous-fuscescent; paler beneath; laciniæ plane (the margins sometimes crisped, pulverulent), fertile ones short; apoth. adnate to the upper side of the lobes, dark-fuscous. *Fr. Lichenogr. p.* 39.

Trees and dead wood. Branches of dwarf firs, with C. pinastri, White Mountains, fertile. Arctic America, *Rich.* Hudson's Bay, *Herb. Banks!* Northwest Coast, *Menzies!*

10. C. *ciliaris*, Ach. Th. subcoriaceous, foliaceous, reticulate-lacunose, greenish glaucous becoming fuscescent; whitish-fuscescent beneath; laciniæ ascendant, crisped, ciliate or black-denticulate; apoth. elevated, blackish-fuscous, with a crenate margin. *Ach. Syn. p.* 227.

Trunks of trees, and old rails, common and fertile; ascending to subalpine districts, where it is often very small, and resembles the last. New England. New York, *Halsey*. Pennsylvania, *Muhl.!*

11. C. *lacunosa*, Ach. Th. cartilagineous-coriaceous, foliaceous, round-lobed, rugose-reticulate-cellulose, glaucescent; whitish on the under side, or spotted with white; laciniæ ascending, the margins crenate, crisped, black-denticulate; apoth. large, elevated, dark-reddish, entire. *Ach. Meth.* 295, *t.* 5, *f.* 3, *Syn. p.* 227. *Lichen cavernosus*, *Menz. herb.* — *β. Atlantica*, Tuckerm.; cartilagineous-membranaceous, lacunose-reticulate; apoth. at length perforate. *C. lacunosa*, *Hals. Lich. N. Y., l. c.* & *Auct. Amer.* *C. Tuckermanii*, *Oakes in Sill. Jour.*

Trunks of trees, and old rails. — *α*, Northwest coast, *Menzies!* — *β*, Lake Superior to New England, fertile. New York, *Halsey*. Pennsylvania, *Muhl.* The plant of Menzies differs from ours considerably, but more specimens of the Oregon Lichen are required, to settle the distinctness of the two.

12. C. *placorodia*, Tuckerm. Th. subcartilagineous, foliaceous, of narrow, at first smooth and discrete, at length convex, concrete, and plicate lobes, finally besprinkled with black grains or wholly isidiophorous, pale livid-glaucous; on the under side fuscescent, rugose, smooth, sparingly fibrillose; laciniæ crisped, crenate; apoth. marginal, peltate on the ascending lobules, from pale fuscous becoming dark chestnut, with an inflexed crenate margin, at length explanate. *Parmelia placorodia*, *Ach.! Syn. p.* 196.

Trunks (normal), Chelmsford, *Russell!* and common on rails, where (like C. ciliaris, C. lacunosa, and others) it assumes a Parmeliaceous aspect. From Parmelia it appears to me distinct, in its marginal, peltate apothecia, and its smooth, reticulate-rugose under-side. Acharius was acquainted only with the rail-Lichen.

13. C. *aurescens*, Tuckerm. Th. subcoriaceous, foliaceous, plane, sinuate-lobed, yellowish-green; beneath whitish with pale fuscescent fibres; margins of the lobes elevated, crisped, black-denticulate; apoth. large, elevated, chestnut, with a thin crenulate margin.

Trunks and branches of Coniferæ, New Hampshire. And old rails, Massachusetts.

14. C. *Oakesiana*, Tuckerm. Th. subcoriaceous, foliaceous, depressed, linear-laciniate, from green becoming yellow; fuscous on the under side, with scattered coarse fuscous fibres; laciniæ plane, with elevated, black-ciliate (or more commonly pulverulent) margins; apoth. marginal, elevated, rufous-fuscous, somewhat entire. *Tuckerm. Lich. N. E. in Bost. Jour. Nat. Hist.* 1841, *p.* 445.

Trees and rocks in mountain forests, New England; fertile.

15. C. *viridis*, Schwein. Th. membranaceous, foliaceous, round-lobed, lacunose-reticulate, glaucous-green; pale yellow on the under side; margins waved, black-denticulate; apoth. chestnut-brown, with an inflexed, lobate-dentate margin. *Schwein. in Hals. Lich. N. Y. l. c. p.* 16.

Cedars, Massachusetts. New York, *Halsey*. Certainly very near the next; and the Massachusetts Lichen here referred to it is perhaps nothing but a state of C. juniperina, *β*.

16. C. *juniperina*, Ach. Th. membranaceous, foliaceous, ascendant, sublacunose, lacerate-laciniate, bright yellow; on the under side subreticulate, of the same color; laciniæ concave, crisped, black-denticulate; apoth. adnate to the lobes in front, disk fuscous, margin crenulate. *Fr. Lichenogr. p.* 40. *C. juniperina*, *Ach. Syn. p.* 226, & *C. Tilesii*, *Ach.! Syn. p.* 228. — *β. virescens*, Tuckerm.; glaucous-green becoming pale yellowish, pale beneath.

On trees, and on the earth, Arctic America, *Rich.*, *Hook.!* — *β*, cedars and other trees, and rails, on the coast of Massachusetts, *Russell!* and southward to New York, *Torrey*, and Pennsylvania, *Muhl.* Our *β* can be compared only with the low-country Lichen of the North of Europe, from which it appears to differ as described. The alpine European forms, and our own arctic ones, recede variously from this type.

17. C. *pinastri*, Sommerf. Th. membranaceous, foliaceous, depressed, round-lobed, greenish-yellow; laciniæ plane, not denticulate (with crisped and powdery margins in the sterile plant); 'apoth. marginal, disk yellowish-brown, margin obtuse.' *Fr. Lichenogr. p.* 40. *C. juniperina*, *β. pinastri*, *Ach. Tuckerm. Lich. N. E. l. c.*

Subalpine shrubs and rocks; also trees in mountain woods and swamps, infertile; New England. Northward to Arctic America, *Rich.*

V. NEPHROMA, Ach.

Apothecia reniform, plane, not velate, adnate to the under side of the thallus, with an elevated thalline margin. Thallus membranaceous, softish, somewhat villous on the under side.

Nephroma is constituted a section of Peltigera in the Lichenographia of Fries, but in his Flora Scanica, 1835, and his Summa Fl. Scand. 1845, these genera are recognized as distinct; as they are also by Montagne. Feé (Crypt. Exot. Suppl. p. 8) remarks that they differ also in their thecæ.

1. N. *arcticum*, Fr. Thallus coriaceous-membranaceous, smooth, ochroleucous; on the under side subvillous, becoming black; fertile lobules somewhat elongated, erectish; apothecia dark orange-red. *Peltigera arctica*, *Fr. Lichenogr. p.* 42. *N. polaris*, *Ach. Tuckerm. Lich. N. E. l. c.*

Rocks among mosses, and on dwarf firs, in alpine and subalpine districts. White Mountains, fertile. Abundant in Newfoundland, and forming patches of two or three feet in extent, *Pylaie!* in herb. Kunth. Northward to Greenland, *Brasen* (Fl. Dan.), and elsewhere in Arctic America, *Rich.*

2. N. *resupinatum*, Ach. Th. cartilagineous-membranaceous, smooth, from glaucous becoming fuscescent; pale and downy on the under side which is sparingly besprinkled with whitish soredia; apoth. rufous-fuscous. *Ach. Syn. p.* 241.

Trunks, often of mountain ash, in mountain forests, luxuriant and fertile; New England. New York, *Halsey*. Arctic America, *Rich.* Darker on rocks, where it is frequently quite small.

3. N. *parile*, Ach. Th. membranaceous, suborbiculate, softish, livid-fuscous; on the under side naked, rugulose, dark; (the lacinia often sorediiferous, and pulverulent at the margins), fertile lobules short; apoth. dark-fuscous. *Ach. Syn. p.* 242.

Rocks. White Mountains, not uncommon. And on the coast, *Mr. Oakes*. Fertile.

4. N. *Helveticum*, Ach. Th. cartilagineous-membranaceous, somewhat rigid, glaucous-fuscescent; on the under side tomentose, becoming black; margins of the lobes and of the apothecia fimbriate-toothed; fertile lobules somewhat elongated; apoth. blackish. *Ach. Syn. p.* 24

Trees and rocks, fertile, New England. A small rock-form occurs (N. aspera, Tuckerm. Lich. N. E. l. c.), analogous to a similar one of N. resupinatum.

VI. PELTIGERA, Hoffm.

Apothecia orbiculate, peltæform, plane, adnate to the upper side of elongated lobes of the thallus, or more rarely marginal; with a thin margin of the thallus. Thallus coriaceous-membranaceous, venose on the under side.

1. P. *malacea*, Ach. Thallus spongy, soft, smooth, round-lobed, fuscous-cinerascent, clothed on the under side with a dense blackish tomentum becoming white towards the margins; apothecia ascendant, rounded, margin crenulate. *Fr. Lichenogr. p.* 44.

Mountainous districts; on the earth and on shrub firs near the limit of trees, and on rocks at lower elevations, White Mountains.

2. P. *aphthosa*, Hoffm. Th. coriaceous, smooth, besprinkled with warts, bright green (and glaucescent); reticulated with blackish veins, and fibrillose on the under side; apoth. large, ascendant, round, with a somewhat lacerate margin. *Fr. Lichenogr. p.* 44.

Rocks among mosses, and on the earth. Common in mountain forests; New England. New York, *Torrey*. Pennsylvania, *Muhl.* Northward to Newfoundland, *Pylaie;* and Arctic America, *Rich., R. Br.*

3. P. *canina*, Hoffm. Th. membranaceous, flaccid, scrobiculate, subtomentose, fuscous-green (and cinerascent, and hoary); the under side whitish and reticulated with pale fuscous veins; apoth. ascendant, rounded, at length semi-revolute, vertical. *Fr. Lichenogr. p.* 45.

On the earth, rocks, and mossy trunks, common in New England. New York, *Torrey*. Pennsylvania, *Muhl.* Northward to Greenland, *Giesecke*.

4. P. *rufescens*, Hoffm. Th. coriaceous, soft, subtomentose, cinereous-virescent (and cinereous, and rufescent); fuscous-fibrillose on the under side, and reticulated with black-fuscous veins; lobes rather narrow, with elevated and crisped margins; apoth. at length vertical, oblong, revolute. *Fr. Lichenogr. p.* 46. *Peltidea spuria, Ach. Tuckerm. Lich. N. E. l. c.*

On the earth, rocks, and trunks among mosses; New England. Thallus smaller and thicker than in the last.

5. P. *polydactyla*, Hoffm. Th. papyraceous, very smooth, shining, plumbeous-virescent (and gray), on the under side almost naked, reticulated with spongy fuscous veins; (fertile lobules often very numerous;) apoth. ascending, finally revolute. *Fr. Lichenogr. p.* 46. —*β. scutata*, Fr.; margins often crisped (or powdery); apoth. at first transversely oblong, at length erect and revolute. *Fr. l. c. Peltidea scutata, Ach.*

Rocks and trunks among mosses, abundant in mountain forests; New England. New York, *Halsey.* Pennsylvania, *Muhl.* The variety *β* may be taken for the next species, which has a different thallus. P. reticulata, Hook. ms. (herb. Borr. !), from the Northwest Coast, is near this, but apparently a distinct species. I have not seen the description.

6. P. *horizontalis*, Hoffm. Th. coriaceous, lacunulose, smooth, fuscous-virescent; the under side reticulated with black veins; apoth. transversely oblong, plane, horizontal. *Fr. Lichenogr. p.* 47.

Rocks and trunks, among mosses, less common than the last; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Margins of the thallus sometimes crisped, and the under side scarcely venose (var. lophyra, Ach.).

7. P. *venosa*, Hoffm. Th. coriaceous (small), fan-shaped, simple, green (and cinereous); white on the under side, and variegated with fuscous-black, divaricately branched veins; apoth. adnate to the thallus, round, horizontal. *Fr. Lichenogr. p.* 48.

On the earth, in woods. Pennsylvania, *Muhl.* New York, *Torrey.* Northwest Coast, *Menzies !*

VII. SOLORINA, Ach.

Apothecia suborbiculate, depressed, adnate to the disk of the thallus, covered originally with a thin membrane, which forms at length an evanescent margin, 'subgelatinous within.' Thallus coriaceous-membranaceous, foliaceous, venose or lanuginous beneath.

Eschweiler (Syst. p. 21, & Lich. Brasil. in Mart. Fl. Bras. 1833, p. 60) considers this genus very distinct from Peltigera in the peculiar evolution of its apothecia. The apothecia of some species of Peltigera are indeed velate, and this is the case with nearly all, according to Fries; but these groups differ also in their thecæ, as shown by Eschweiler and by Feé, and in a somewhat different habit. Montagne (Bot. Zeitung

1, p. 476), Flotow (Ibid. p. 613), Feé (Crypt. Exot. l. c.), and J. D. Hooker (Lich. Antarct. in Hook. Jour. Bot.) have enlarged the present genus by the addition of some interesting tropical and other species.

1. S. *crocea*, Ach. Thallus coriaceous, lobed, obscurely green becoming cinnamon-colored; on the under side saffron-colored, with rather obscure, branched, anastomosing veins; apothecia applanate, immarginate, dark-chestnut. *Ach. Syn. p.* 8. *Peltigera, Fr. Lichenogr. p.* 48.

On the earth, Arctic America. Greenland, *Dill.* North of Point Lake, *Rich.* (Herb. Hook. !).

2. S. *saccata*, Ach. Th. membranaceous, subimbricate, from green becoming greenish-cinerascent; on the under side whitish and fibrillose; apoth. applanate, finally saccate-depressed, blackish-fuscous. *Ach. Syn. p.* 8. *Peltigera, Fr. Lichenogr. p.* 49.

Rocks (limestone), New York, *B. D. Greene, Esq.* Newfoundland, *Pylaie.* Northward to Bear Lake, *Herb. Hook.!* Solorina orbiculata, Menz. herb.! from the Pacific coast, appeared to me a distinct, but I believe it is an undescribed species.

VIII. STICTA, Ach.

Apothecia scutelliform, adnate to the margin or disk of the thallus, somewhat oblique, the margin free beneath. Disk at first closed, nucleiform; becoming at length elevated and explanate. Thallus expanded from a centre, foliaceous, coriaceous-cartilagineous, lobate, villous on the under side, and having on this side small, regular urceolate cavities (*cyphellæ*), or where these are wanting soredia, or discolored spots.

A mostly tropical genus, with many West Indian and South American species, some of which are represented in the extreme southern parts of the United States.

1. S. *aurata*, Ach. Thallus subcoriaceous, reddish-brick-colored; on the under side lanuginous, reddish-yellow at the circumference, and besprinkled with small, irregular, often sorediiform, yellow cyphellæ; laciniæ rounded, sinuate-cut, the margins undulate, crisped, and yellow-pulverulent; 'apothecia marginal, disk plane, fuscous-red, margin inflexed.' *Delis. Stict. p.* 49.

Among mosses on rocks and trees. (Southern States! and Texas! infertile.) Ohio? The Southern Lichen probably occurs within our limits.

2. S. *crocata*, Ach. Th. submembranaceous, scrobiculate, greenish-glaucous-fuscescent; on the under side lanuginous, liver-colored a the circumference, with minute, pale-lemon-colored cyphellæ; laciniæ short, rounded, crenulate, with yellowish-pulverulent margins; 'apoth scattered, fuscous-black.' *Delis. Stict. p.* 56.

Rocks among mosses, New England, infertile; less common in the Northern mountains. S. *Feei*, Delis. l. c. p. 44, from North America, is perhaps a Southern species.

3. S. *sylvatica*, Ach. Th. coriaceous-membranaceous, laciniate-lobed lacunulose, greenish-fuscous; tomentose, and subfuscous-cinerascen beneath, with urceolate, whitish cyphellæ; lobes somewhat truncate, rounded, crenulate; 'apoth. marginal, peltate, rufous-fuscous.' *Fr. Lichenogr. p.* 51.

Rocks, among mosses. Pennsylvania, *Muhl.*, New York, *Halsey.* S. *fuliginosa*, Ach., differs principally in its round-lobed, rugose fronds frequently isidioid-efflorescent, and its (normal) sessile, orbiculate apothecia. The described apothecia of S. sylvatica depend upon the figures of Dillenius, Wulfen, &c. The species is now unknown in a fertile state.

4. S. *quercizans*, Ach. Th. cartilagineous, laciniate, plane, pale-rufous-fuscous; somewhat tomentose, and subfuscous-nigrescent beneath with urceolate (membranaceous), whitish cyphellæ; lobes subimbricate oblong, rounded, crenulate; 'apoth. scattered, disk somewhat concavo plane, with a thin entire margin.' *Delis. Stict. p.* 84. *Lobaria*, *Michx* Pennsylvania, *Herb. Montagne!* Mossy rocks, New York, *Russell.* The specimens from Mr. Russell seem to me to differ from S. sylvatica in the characters indicated by Delise, and to agree with his S. quercizans, as they also do with my brief notes on the specimen (from Carolina) in herb. Michaux. S. *Beauvoisii*, Delis. l. c. p. 83, constitute on a North American Lichen, seems hardly distinct from the present.

5. S. *scrobiculata*, Ach. Th. coriaceous, suborbiculate, lax, scrobiculate, leaden-gray (and glaucescent); lanuginous on the under side with naked, white spots; laciniæ rounded, somewhat entire (commonly sorediiferous); 'apoth. scattered, from rufous becoming fuscous.' *Fr. Lichenogr. p.* 53.

Trunks, and rocks among mosses, New England; infertile. Northward to Newfoundland, *Pylaie.* S. *limbata*, Ach., a species resembling this, but with urceolate, true cyphellæ, very possibly occurs with us.

6. S. *anthraspis*, Ach. Th. cartilagineous-membranaceous, lac

nose-reticulate, broadly round-lobed, cinereous-virescent; rugulose and somewhat villous beneath, with small, white, sorediiform cyphellæ; lobes somewhat crenate; apoth. scattered, disk at length convex, black, and excluding the entire thalline margin. *Ach. Syn. p.* 233.

On the earth, among mosses; Northwest Coast, *Menzies!* New York, *Halsey.* The upper surface resembling that of S. pulmonaria.

7. S. *pulmonaria*, Ach. Th. coriaceous, lax, lacunose-reticulate, dark green (and olivaceous); tomentose on the under side, with naked, white spots; laciniæ elongated, discrete, sinuate-lobed, retuse-truncate; apoth. submarginal, rufous. *Fr. Lichenogr. p.* 53. *Lichen pulmonarius, L.*

Trunks in mountain forests, fertile. Also on rocks, where various sterile forms are found. Among these is S. linita, Ach., quoted by Delise as from the United States, which has occurred at the White Mountains, with all the features of the Swiss Lichen. New England. New York, *Torrey.* Pennsylvania, *Muhl.* Newfoundland, *Pylaie.*

8. S. *glomerulifera*, Delis. Th. coriaceous-cartilagineous, thick, orbicular, appressed, smooth, from pale green becoming glaucescent; villous on the under side, with scattered, excavated cyphellæ (which are often wanting); laciniæ elongated, sinuate-lobed; apoth. scattered, dark-reddish-chestnut, with a rugose, persistent margin. *Delis. Stict. p.* 129. *Tuckerm. Further Enum. l. c. Parmelia, Ach.*

Trunks of trees, and rocks, fertile; New England. Pennsylvania, *Muhl.* in herb. Willd.! Northward to Newfoundland, *Pylaie.* The green glomerules of the European Lichen always wanting in ours. Young plants of this species may be taken for the next.

9. S. *herbacea*, Ach. Th. membranaceous, appressed, smooth, obscurely green (and glaucescent); on the under side paler, lanuginous, the membranaceous, hoary cyphellæ rare; laciniæ sinuate-repand, rounded at the apices; apoth. scattered, rufous, margin crenulate. *Ach. Syn. p.* 341. *Parmelia, Ach. Syn. p.* 198.

Trunks and rocks. Pennsylvania, *Muhl.* New York, *Torrey, Halsey.* Arctic America, *Rich.*

IX. PARMELIA, Ach., Fr.

Apothecia scutelliform, orbicular, adnate horizontally to the disk of the thallus, with an equal thalline margin. Disk at first connivent-

closed, somewhat waxy. Thallus expanded horizontally from a centre, two-sided, of various form, upon a hypothallus. *Fr. Lichenogr. p.* 56.

Synopsis of the Sections.

Sect. I. The fibrillose hypothallus adnate to the foliaceous thallus which is discrete from the matrix.

Subsect. I. Imbricaria, Fr. — Apothecia elevated, subpedicellate, regular; disk very thin, naked, placed upon the gonimous layer. Thallus imbricate-foliaceous; often black-dotted from abortion of the apothecia. — Sp. 1–24.

Subsect. II. Physcia, Fr. — Apothecia at first closed, at length dehiscent. Disk thickish, waxy, placed upon the medullary layer. Thallus normally foliaceous; ascendant or stellate; fibrillose on the under side.

* Thallus normally ascendant, or loosely decumbent; apoth. somewhat obliquely marginate. — Sp. 25.

** Thallus normally stellate-appressed; apoth. plane. — Sp. 26–33.

Sect. II. Thallus subfoliaceous, at length compacted into a conglomerate, subgranulose crust; arising from a fibrillose (rarely obsolete) hypothallus, which is adnate to the matrix.

Subsect. III. Pyxine, Tuckerm. — Apothecia erumpent, at first closed, palish; becoming patellæform, and, with the altered thalline margin, black; finally cephaloid, excluding the margin. Thallus subfoliaceous, imbricate-laciniate, at length crustaceous-concrete at the centre, on a black, fibrillose hypothallus. — Sp. 34.

Subsect. IV. Amphiloma, Fr. — Apothecia erumpent, somewhat coronate with an accessory thalline margin. Disk waxy, thickish, naked. Thallus foliaceous, somewhat monophyllous, rounded, at length crustaceous-compact at the centre, placed on a spongy pannose hypothallus. — Sp. 35–38.

Subsect. V. Psoroma, Fr. — Apothecia for the most part two-formed, adnate or immersed; arising in the one case from the thallus with a crenate-thalline margin; and in the other from the hypothallus, with an entire proper margin. Disk waxy. Thallus of discrete, foliaceous squamules, arising from a common hypothallus; often at the centre, or wholly, concrete in a subgranulose crust. — Sp. 39–41.

Sect. III. Thallus crustaceous, lobed at the circumference, or wholly squamulose-effigurate. Hypothallus smooth, adnate to the matrix, often confused with the thallus.

Subsect. VI. PLACODIUM, Fr. — Apothecia plano-scutelliform, elevated, disk without proper margin, naked. Thallus as above. (Thalline margin often colored like the disk.) - - Sp. 42 – 47.

Subsect. VII. PSORA, Fr. — Apothecia innate, at first somewhat urceolate, afterwards scutelliform. Disk with a proper margin (visible at least in the younger apothecia), normally at first cæsious-pruinose. Thallus as above. — Sp. 48 – 50.

Sect. IV. Thallus crustaceous, uniform. Circumference similar, or the hypothallus sometimes fibrillose-radiant.

Subsect. VIII. PATELLARIA, Fr. — Apothecia regular, scutelliform, sessile, the thalline margin persistent. Lamina of the disk somewhat plane, without proper margin. Thallus crustaceous, adnate to an indeterminate, mostly black hypothallus. Disk not cæsious-pruinose. — Sp. 51 – 66.

Subsect. IX. URCEOLARIA, Fr. — Apothecia innate in the crust, or immersed in protuberant warts. Lamina urceolate, or protuberant, verrucæform, blackish, normally cæsious-pruinose, marginate. Thallus crustaceous; the whitish hypothallus confused with the thallus, or often fibrillose and radiant. — Sp. 67 – 70.

SECT. I. The fibrillose hypothallus adnate to the foliaceous thallus.

Subsect. I. IMBRICARIA, Fr.

Series 1. *Glaucescentes*, Fr.

1. P. *crinita*, Ach. Thallus submembranaceous, suborbicular, glaucous-fuscescent (the whole thallus, as well as the apothecia, beset with isidioid granules and branchlets); black and somewhat smooth on the under side, and here and there black-fibrillose; lobes plane, with somewhat ascendant, erose-crenate, ciliate margins; apothecia (imperforate) marginal, subpedicellate, cyathiform, with a thin, inflexed, crenulate margin, at length explanate, large. *Ach. l Syn. p.* 196. *P. perforata, β. Fr.* Trunks, &c., fertile; New England. New York, *Torrey*. Pennsylvania, *Muhl*. There appear to be indications of other differences beside the isidioid efflorescence to distinguish this from P. perforata. The latter is perfectly normal with us.

2. P. *perforata*, Ach. Th. membranaceous, smooth, greenish-glaucescent; on the under side black, with dark fibres; lobes rounded, ascendant, subcrenate, ciliate; apoth. large, rufous, elevated, infundibuliform; disk perforate, at length explanate, margin very entire. *Fr. Lichenogr. p.* 58.

Trees, particularly on the coast, luxuriant and fertile. Also on stones, &c., in sterile states. Pennsylvania and Virginia (from Bartram and Mitchell), *Dill.*, the original stations of the Lichen. New England. New York, *Torrey*. Northwest Coast, *Menzies* (Herb. Smith!).

3. P. *perlata*, Ach. Th. submembranaceous, suborbicular, greenish-glaucous; on the under side blackish-fuscous, scarcely fibrillose; lobes rounded, plane, not ciliate; apoth. elevated, dark red, cyathiform, at length explanate, margin thin, entire. *Fr. Lichenogr. p.* 59. — *β. olivetorum*, Ach.; margins of the lobes elevated, crisped, white-pulverulent. *Ach. Syn. p.* 198.

Trunks and rocks in mountainous districts, fertile; and common also in sterile forms; New England. New York, *Halsey*.

4. P. *scortea*, Ach. Th. subcoriaceous, orbicular, smooth, glaucous-white; on the under side black, hispid-fibrillose; lobes longish, sinuate-crenate, incised; apoth. rufous-fuscous, margin somewhat entire. *Ach. Syn. p.* 197.

Stones and trunks, fertile; New England. New York, *Halsey*. Pennsylvania, *Muhl.* Less common than the next, with which Fries unites it.

5. P. *tiliacea*, Ach. Th. membranaceous, orbicular, smoothish, glaucous-cinerascent; on the under side blackish-fuscous, with black fibres; lobes sinuate-laciniate, the external ones rounded, crenate; apoth. subfuscous, margin very entire. *Ach. Syn. p.* 199.

Trunks, fertile, very common; New England. New York, *Halsey*. Pennsylvania, *Muhl.* Nova Scotia, *Menzies!*

6. P. *Borreri*, Turn. Th. cartilagineous-membranaceous, orbicular, smoothish, glaucous-cinerascent (with round, marginate soredia on the under side fuscescent, fuscous-fibrillose; laciniæ rounded at the apices, naked; apoth. chestnut, margin inflexed, entire. *Fr. Lichenogr. p.* 60. — *β. rudecta*, Tuckerm.; soredia immarginate; the whole thallus beset with isidioid granules and branchlets. *P. rudecta*, *Ach. Syn. p.* 197.

Trunks, &c., fertile; New York, *Halsey*. — *β*, New England. Pennsylvania, *Muhl*. The anamorphous development called by Sommerfelt Lecidea Parmeliarum, and referred by Acharius to Endocarpon, occurs not unfrequently in this species, as well as in the next.

7. P. *saxatilis*, Ach. Th. subcartilagineous, reticulate-lacunose, glaucous-cinerascent; black and fibrillose beneath; laciniæ sinuate-lobed, plane, subretuse; apoth. dark-chestnut, margin at length crenate. *Fr. Lichenogr. p.* 61. — *α*; laciniæ irregularly imbricate, narrower. *Ach. Lichenogr. p.* 469. — *β. rosæformis*, Ach.; th. orbicular, lobes wider, besprinkled commonly with elongated, marginate soredia; apoth. smaller, less explanate. *Ach. l. c. p.* 471. — *γ. omphalodes*, Fr.; th. smoothish, shining, dark purplish-fuscous, laciniæ subtruncate. *Fr. Lichenogr. p.* 62. *Parmelia omphalodes*, *Ach. Syn. p.* 203.

Rocks and stones, and, somewhat less commonly, on trees and rails, fertile; New England. New York, *Torrey*. Pennsylvania, *Muhl*. Northward to Arctic America, *Rich*. — *γ*. Arctic America.

8. P. *aleurites*, Ach. Th. membranaceous, orbicular, contiguous, rugose-plicate, glaucescent (at length furfuraceous); on the under side pale, with fuscous fibres; lobes discrete at the circumference, plane, rounded, cut-crenate; apoth. dark-fuscous, margin at length crenulate. *Fr. Lichenogr. p.* 62.

Dead wood, and firs, in mountainous districts, fertile; and on rocks, sterile. The sterile plant is also common on rails, &c., on the coast. New England. New York, *Halsey*. Fries refers to this species the *P. obsessa*, Muhl. Catal., and Ach. Syn. p. 213.

9. P. *lævigata*, Ach. Th. membranaceous, suborbicular, smooth, glaucescent; black, and fibrillose on the under side; laciniæ multifid, linear, plane, cut, divaricate (often sorediiferous); apoth. chestnut, margin very entire. *Ach. Syn. p.* 212.

Trunks (very common on beech in mountainous districts), fertile.

10. P. *sinuosa*, Ach. Th. membranaceous, suborbicular, smooth, glaucescent; black, and fibrillose on the under side; laciniæ linear, wider at the circumference, sinuate-pinnatifid, the sinuses wide, circumscribed; apoth. somewhat plane, fuscous, margin thin, very entire. *Ach. Syn. p.* 207.

Trunks and rocks. Nova Scotia, *Ach*. Fries and Meyer refer this and the last to a single species, but Borrer regards them distinct.

11. P. *terebrata*, Mart. Th. somewhat inflated, suborbicular, greenish-glaucescent; plicate-rugose and black on the under side; laciniæ radiant, approximate, plane-appressed, sublinear (often sorediiferous), with small, regular, rounded perforations; apoth. scattered, plane, red, margin very entire. *Mart. Fl. Crypt. Erlang.* *P. diatrypa*, *Ach. Syn. p.* 219. *Tuckerm. Lich. N. E. l. c.*

Trunks in mountain forests, frequent, and rocks, fertile; New England

12. P. *physodes*, Ach. Th. somewhat inflated, suborbicular, glaucous-white; black-fuscous and naked on the under side; laciniæ loosely imbricate, linear, sinuate-multifid, somewhat convex; apoth. elevated, reddish-fuscous, with an inflexed, entire margin, at length explanate. *Ach. Syn. p.* 218. — *β. enteromorpha*, Tuckerm.; laciniæ effuse, lax, somewhat elongated, ventricose-inflated; apoth. subpedicellate, ventricose-cyathiform, at length explanate, very entire. *P. enteromorpha. Ach.! Syn. p.* 219. *P. platycarpa, Tuckerm. Lich. N. E. l. c.*

Trunks, dead wood, and rocks, fertile; New England. New York *Torrey*. Pennsylvania, *Muhl.* North to Arctic America, *Rich.* — *β.* firs and other trees in high mountain forests. Northwest Coast, *Menzies! Douglas* in herb. Hook.! Mountains of New England, fertile, and evidently passing into *α*.

13. P. *colpodes*, Ach. Th. somewhat inflated, suborbicular, greenish-glaucescent; black and spongy on the under side; laciniæ somewhat plane, at the circumference ramose-multifid, with irregularly dentate margins; apoth. elevated, chestnut, margin inflexed, entire. *Swartz Lich. Amer. p.* 4, & *t.* 3. *Ach.! Syn. p.* 219.

Trunks. Near Boston, *Swartz* (the original station of the Lichen). Throughout New England, common and fertile. New York, *Halsey*. Pennsylvania, *Muhl.*

Series 2. *Olivaceo-fuscæ*, Fr.

14. P. *olivacea*, Ach. Th. membranaceous, orbicular, smooth, rugulose (elevated-punctate, or granulate-farinose), olivaceous-fuscous, paler and subfibrillose on the under side; lobes radiant, appressed, plane, rounded, crenate; apoth. dark-olive, with an inflexed, at length crenate margin. *Fr. Lichenogr. p.* 66.

Trees in mountainous districts, fertile; also degenerant on dead wood and stones; New England. New York, *Torrey*. Pennsylvania, *Muhl.* Northward to Arctic America, *Rich.*

15. P. *Fahlunensis*, Ach. Th. subcartilagineous, smoothish, from dark-olive becoming blackish; on the under side paler, subfibrillose; laciniæ digitate-multifid, somewhat plane, subcanaliculate; apoth. dark-fuscous, crenulate. *Fr. Lichenogr. p.* 66. — *β. sciastra*, Fr.; smaller, orbicular; apoth. subentire. *Fr. Lichenogr. p.* 67. *Parmelia*, Ach.

Alpine and subalpine rocks, and occurring also at lower elevations in mountainous districts. White Mountains; Chin of Mansfield, and other of the Green Mountains; fertile. Northward to Newfoundland, *Pylaie*, and Arctic America, *Rich.* — *β*, Greenland, *Dill.*

16. P. *stygia*, Ach. Th. subcartilagineous, shining, from olivaceous-fuscous becoming black; very black on the under side and obsoletely fibrillose; laciniæ palmate-multifid, sublinear, convex, recurved at the apices; apoth. fuscous-black, crenate. *Fr. Lichenogr. p.* 67. — *β. lanata*, Mey.; laciniæ setaceous, filiform, [illegible], intricate, fuscous-nigrescent; apoth. subgranulate-marginate. *Mey. Entwick. der Flecht. p.* 231. *Fr. l. c. p.* 68. *Cornicularia lanata*, *Ach. Syn. p.* 302.

Alpine and subalpine rocks. White Mountains and the higher Green Mountains. Northward to Newfoundland, *Pylaie*, and Arctic America, *R. Br.* — *β*, White Mountains, infertile. Northward to Arctic America, *Hook.* Melville Island, *R. Br.*

Series 3. *Ochroleucæ*, Fr.

17. P. *caperata*, Ach. Th. submembranaceous, orbicular, rugose (or granulose-pulverulent), ochroleucous; on the under side blackish and sparingly fibrillose; lobes sinuate-laciniate, rounded, somewhat entire at the apices; apoth. fuscous-red, margin tumid-incurved, rugose-crenate. *Fr. Lichenogr. p.* 69.

Trunks and stones, not commonly fertile; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Westward to Illinois, *Russell!* North to Arctic America, *Rich.*

18. P. *conspersa*, Ach. Th. submembranaceous, smoothish, polished (oftener black-punctate), greenish-straw-colored; fuscous and black-fibrillose beneath; laciniæ variously flexuous, somewhat plane at the circumference, sinuate; apoth. dark-chestnut, margin subentire. *Fr. Lichenogr. p.* 69. — *β. stenophylla*, Ach.; laciniæ elongated, linear, pinnatifid, imbricate-complicate. *Ach. Syn. p.* 209.

Rocks and stones, commonly remarkable for its very numerous apothecia; New England. New York, *Torrey.* Pennsylvania, *Muhl.* North to Arctic America, *Rich.* Degenerate on rails, &c.

19. P. *incurva*, Fr. Th. cartilagineous-membranaceous, stellate-imbricate, globuliferous, greenish-straw-colored (and ochroleucous); black and fibrillose on the under side; laciniæ very narrow, multifid, subterete, recurved at the apices; apoth. rufous-fuscous, subentire. *Fr. Lichenogr. p.* 70. *P. recurva*, Ach.

Rocks in mountainous districts (subalpine, and descending). White Mountains; fertile.

20. P. *ambigua*, Ach. Th. membranaceous, orbicular, stellate-imbricate, farinose-sorediiferous, greenish-straw-colored (and ochroleucous); black and fibrillose on the under side; laciniæ plane, linear, appressed, multifid; apoth. adnate, rufous-fuscous, very entire. *Fr. Lichenogr. p.* 71.

Trunks and dead wood in mountainous districts, fertile; and on rocks, infertile; White Mountains. Northward to Arctic America, *Rich.*

21. P. *centrifuga*, Ach. Th. submembranaceous, suborbicular, greenish-straw-colored (and ochroleucous); white and fibrillose on the under side (the crust-like centre often falling away, and leaving a concentrically disposed circumference); laciniæ linear, concrete, convex, rugose; apoth. rufous-fuscous, margin subentire. *Fr.! Lichenogr. p.* 71.

Rocks (subalpine and descending) in mountainous districts, fertile; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Northward to Newfoundland, *Herb. Banks! Pylaie.* An ochroleucous, black-punctate, not concentrically disposed state is P. Halseyana, Tuckerm. Lich. N. E. l. c. It occurs in the Notch of the White Mountains.

Series 4. *Citrinæ*, Fr.

22. P. *parietina*, Fr. Th. foliaceous or squamulose, imbricate, membranaceous, sublobate, yellow; paler and obsoletely fibrillose on the under side; apothecia with elevated margins, very entire. *Fr. Lichenogr. p.* 72. — *α.* (*foliacea*), Fr.; th. foliaceous, from greenish becoming bright yellow; lobes explanate, appressed. *P. parietina*, *Ach.* — *β. aureola*, Fr.; th. foliaceous, somewhat zoned and subcentrifugal, dark-golden-yellow; lobes concrete, plicate-ramose. *P. aureola*, *Ach.* — *γ. rutilans*, Fr.; th. foliaceous-subcrustaceous, imbricate-complicate, irregularly laciniate. *P. rutilans*, *Ach.* — *δ. laciniosa*, Duf.; th. naked, lacerate-dissected, squamulose; laciniæ ascending, naked. — *ε. polycarpa*, Fr.; th. smaller, conglomerate; the lobes complicated, and covered with the

very numerous apothecia. *Lecanora caudelaris*, *β. Ach.* — *ζ. lobulata*, Fr.; th. obliterated, or consisting only of very short, scattered, appressed lobules, with small apothecia. — *η. substellata*, Ach.; th. foliaceous, substellate, lacerate-laciniate, laciniæ expanded, pulverulent. — *ϑ. concolor*, Fr.; th. pulverulent, squamulose, lacerate-laciniate, scales crowded, ascendant. *Lecan. caudelaris*, *α. Ach.* — *ι. citrinella*, Fr.; the whole thallus dissolved into a yellowish-green dust.

Very common: *α*, on trunks, rocks, &c.; *β*, on rocks and stones (especially maritime), exposed to the sun; *γ* and *δ*, on trunks, exposed to the sun; *ε* and *ζ*, on the smaller branches and twigs of trees; *η* and *ϑ*, on smooth bark, the last also common on dead wood; *ι*, on bark and dead wood in moist places; New England. New York (*γ* and *ϑ*), *Halsey*. Pennsylvania (*ϑ*), *Muhl.* Ohio (*α*), *Mr. Lea!* Illinois (*α*), *Russell!* Northward to Nova Scotia (*γ*), *Menzies!* Newfoundland (*α*), *Pylaie*, and Arctic America (*ε* and *ϑ*), *Rich.!* I have adopted Fries's view of the European species nearly entire. He remarks that he has distinguished and enumerated these forms, not so much on account of their importance as distinct states, as to furnish an example, that can almost everywhere be authenticated, of the extremely Protean character of the thallus of Lichens.

23. P. *diversicolor*, Ach. Th. suborbicular, yellowish-orange-red (becoming whitish with age), of rather narrow, somewhat lacerate-ramose, rugose, at length concrete laciniæ; white-cinerascent, with fibres of the same color beneath; apoth. numerous, concave, blackish-sanguineous, margin thick, at length white. *Ach. Syn. p.* 210.

Arctic America, and southward, *Ach.*

24. P. *chrysophthalma*, Ach. Th. subfoliaceous, cartilagineous-membranaceous, lacerate-ramose, from dark reddish-yellow becoming whitish; on the under side whitish, and fibrillose at the margins; laciniæ depressed-subascendant, plano-convex, pinnatifid; apoth. dark-orange, fibrillose-ciliate or naked. *Fr. Lichenogr. p.* 75. *Borrera*, *Ach.* — *β. exilis*, Fr.; laciniæ very narrow; margins of the apothecia naked. *Fr. l. c. Borrera*, *Ach.*

Trunks and branches of trees near the coast, and luxuriant in places exposed to the sea-spray; New England. New York, *Torrey* (at Newburgh, *Russell!*). Pennsylvania, *Muhl.* Illinois, *Russell!*

Subsect. II. Physcia, Fr.

25. P. *ciliaris*, Ach. Thallus cartilagineous, from green becoming glaucous; laciniæ linear, ramose, subascendant, channelled beneath, ciliate with simple fibres; apothecia subterminal, pedicellate, margin erect, at length lacerate-dentate, fimbriate, or obliterated in foliaceous branches; disk plane, black, subpruinose. *Fr. Lichenogr. p.* 77. *Borrera, Ach.* — *β. galactophylla*, Tuckerm.; more delicate; the laciniæ very white and powdery beneath; margins of the apothecia at length obliterated in foliaceous expansions; disk white-pruinose. *P. galactophylla, Willd. herb.!* — *γ. angustata*, Tuckerm.; laciniæ extremely narrow, of nearly the same color beneath, subterete at the apices. *Borrera angustata, Bory ms.*

Trees, New England (*β*), rare. New York, *Torrey.* Pennsylvania (*β*), *Muhl.!* and southward, where *β* common. North to Arctic America, *Rich.* — *γ*, Newfoundland [illegible] in herb. Berol.! Rocky Mountains, *Herb. Hook.!* P. *leucomela*, Ach., a species near this, but with narrow, ascendant laciniæ, and tomentose marginal fibres, occurs in the Carolinas, *Michx.!* and California, *Menzies!* and P. *erinacea*, Fr., with lacerate-laciniate, diffuse lobes, which are ciliate, and beset above with very long whitish fibres, in California, *Menzies!*

26. P. *detonsa*, Fr. Th. cartilagineous, substellate, naked, glaucous-fuscescent (and fuscous); whitish on the under side with black fibres; laciniæ narrow, linear, somewhat convex, digitate-multifid, often semiterete, very densely crowded together and imbricated; apoth. subsessile, margin at length crenate, and leafy, disk plane, becoming dark-fuscous. *Fr. Syst. Orb. Veg. fide ipsius. P. Novæ Angliæ, Tuckerm. in litt. olim. P. aquila, Muhl. Catal.*

Rocks and trees, New England. Ohio, *Mr. Lea!* Near to P. aquila. I have not seen Fries's description.

27. P. *pulverulenta*, Fr. Th. cartilagineous, substellate, pruinose-cinereous; black on the under side and hispid-tomentose; laciniæ linear, multifid, approximate; apoth. sessile, margin tumid, entire, or squamulose-foliose, disk plane, black-fuscous, subpruinose. *Fr. Lichenogr. p.* 79. *P. pulverulenta, venusta, & muscigena, Ach.* — *β. leucoleiptes*, Tuckerm.; the whole thallus white-farinose-pruinose, lobes radiant, margins interruptedly inflexed and pulverulent; apoth. subsessile, disk depressed, white-pruinose, margin subduplicate, the external border foliose or entire. *Lichen leucoleiptes, Muhl. in herb.*

Willd.! *P. venusta*, *Hals. & Auct. Amer.* *P. pulverulenta*, *Muhl. Tuckerm. Lich. N. E. l. c.*

Trunks, rocks, and upon mosses; Bear Lake and elsewhere in Arctic America, *Rich.* (Herb. Hook. !). — *β*, trunks and rocks; New England to Pennsylvania! often isidioid-efflorescent.

28. P. *hypoleuca*, Muhl. Th. cartilagineous, substellate, glabrous, naked, glaucous-virescent (and white); very white on the under side, with scattered black fibres; laciniæ sublinear, approximate, imbricate, multifid, plano-convex, margins naked; apoth. elevated, disk at length black, naked, with an inflexed, crenulate or foliose margin. *Muhl. Catal. p.* 105, *& Eaton Man. Bot. p.* 516. *Tuckerm. Further Enum. l. c.* *P. speciosa*, *β. hypoleuca*, *Ach.! Syn. p.* 211.

Trunks, fertile. Pennsylvania, *Muhl.!* and northward to New England.

29. P. *speciosa*, Ach. Th. cartilagineous-membranaceous, substellate, glabrous, greenish-glaucous (and white); very white beneath, with numerous pale fibres; laciniæ linear, somewhat concavo-plane, imbricate, incised-ramose, crenate, ciliate-fibrillose, margins often ascendant, green-pulverulent; 'apoth. subsessile, margin incurved, crenate, disk rufous-fuscous, nearly naked.' *Fr. Lichenogr. p.* 80.

Trunks and mossy rocks in woods, infertile; New England. Pennsylvania, *Muhl.*

30. P. *congruens*, Ach. Th. coriaceous-membranaceous, whitish-pallescent; on the under side cinereous-fuscescent, with fibres of the same color; laciniæ laxly-imbricate, flexuous, multifid, recurved at the margins, convex, becoming more plane in the circumference, crenate; apoth. elevated, concave, livid-fuscescent, subpruinose, with a thin, inflexed, at length flexuous margin. *Ach. Lichenogr. p.* 491. *Swartz Lich. Amer. p.* 5 *& t.* 4. *Ach. Syn. p.* 207.

Trunks, New England; *Swartz, l. c.* I have a Lichen from the White Mountains resembling this, except that the under side as well as the fibres are black.

31. P. *stellaris*, Wallr. Th. subcartilagineous, naked, not pruinose, glaucescent; whitish on the under side, with dark fibres; laciniæ sublinear, multifid; apoth. sessile, disk fuscous-black, subpruinose, margin somewhat tumid, subentire. *Fr. Lichenogr. p.* 82. — *α.* (*stellari-expansa*), Fr.; th. stellate-expanded, fibres shorter. *Fr. l. c* *P. stellaris*, *aipo-*

lia, & anthelina, Ach. — *β. hispida*, Fr.; laciniæ ascendant, hispid on the margins, or tubulose-inflated. *Fr. l. c. Borrera tenella, Ach.* — *γ.* (*tribracia*), Fr.; laciniæ ascendant, squamulose, sparingly fibrillose, pulverulent at the apices. *Fr. l. c. Lecanora tribracia, Ach. part.*

Trunks, dead wood, and rocks, very common; New England. New York, *Torrey*. Pennsylvania, *Muhl.* Illinois, *Russell!* Northward to Arctic America, *Rich.*

32. P. *cæsia*, Ach. Th. subcrustaceous-membranaceous, substellate, gray (and cinerascent), besprinkled with gray soredia; pale on the under side; laciniæ linear, somewhat convex, subpinnatifid, ciliate-fibrillose; apoth. sessile, margin thin, somewhat inflexed, entire, disk at length naked, black. *Fr. Lichenogr. p.* 83. — *α.* (*stellata*), Fr.; laciniæ stellate-expanded, fibres shorter, soredia regular; *P. cæsia, Ach.*; and the laciniæ sometimes very narrow. *Fr. l. c. P. dubia, Fl.* — *β.* (*squamulosa*), Fr.; laciniæ squamulose, short, obsoletely fibrillose. *Fr. l. c. Lecanora tribracia, Ach. part.*

Rocks, stones, and dead wood, fertile; New England. New York, *Halsey*. Pennsylvania, *Muhl.*

33. P. *obscura*, Fr. Th. submembranaceous, orbicular, not pruinose, greenish, becoming livid-fuscous when dry; black and fibrillose on the under side; laciniæ sublinear, somewhat plane, incised-multifid (often sorediiferous, or the margins pulverulent); apoth. sessile, very entire, disk naked from the first, black-fuscous. *Fr. Lichenogr. p.* 84. *P. cycloselis, Ach.* — *β. ulothrix*, Fr.; laciniæ linear, subciliate, apoth. fibrillose below. *Fr. l. c. P. ulothrix, Ach.*

Trunks, dead wood, &c., and passing into several degenerate states; New England. New York (*α* and *β*), *Halsey*. Pennsylvania (*β*), *Muhl.* Ohio (*β*), *Mr. Lea!* Northward to Arctic America (*α*), *Rich.* — A very distinct species detected recently by Mr. Oakes (P. Tuckermani, Oakes ms.) may be referred to here. Resembling generally small greenish forms of P. parietina, this differs in the foliose-lobate margins of the apothecia, which are also fibrillose beneath, as in P. obscura, *β*. It is common on trunks about Boston (*Oakes, Tuckerman*), and I have found it on rocks at the White Mountains. It was sent from Ohio by the late *T. G. Lea, Esq.* (Herb. Russell!), and I have North Carolina specimens from *Mr. Curtis*. (What is P. *fibrosa*, Fr., referred to incidentally, Lich. pp. 75, 97?)

Sect. II. The subfoliaceous at length subgranulose thallus arising from a fibrillose hypothallus, which is adnate to the matrix.

Subsect. III. Pyxine, Tuckerm.

34. P. *sorediata*, Tuckerm. Thallus subcrustaceous-foliaceous, laciniate-multifid, from green becoming glaucescent, and cinerascent; black on the under side, and thickly clothed with greenish-nigrescent fibres; laciniæ sublinear, canaliculate, incised, obtuse, irregularly imbricate, and concrete at the centre (often sorediiferous); apothecia at first pale, and concave, becoming black, convex, and finally proliferous-papillate and irregular. *Lecidea, Ach. Syn. p.* 54. *Tuckerm. Further Enum. l. c. Lichen alomatus, Willd. herb.! Pyxine, Fr. cit. Eschw.*

Trunks, common (abundantly fertile in mountain forests), and also on rocks; New England. Pennsylvania, *Muhl.!* Rocky Mountains, *Herb. Hook.!* (Southward to Texas!) I have not seen the description of Fries, and am uncertain whether his Pyxine is founded on our Northern Lichen (which is probably what Acharius described), or on the West Indian and South American Lecidea sorediata of Eschweiler. The latter seems distinct, and has been separated as Circinaria Berteriana by Feé (Crypt. Exot. p. 128). Our Lichen appears to me a modification of Parmelia, near to Amphiloma, Fr. The apothecia have some of the features of those of Umbilicaria, and illustrate Fries's observation, that this genus is related to Parmelia.

Subsect. IV. Amphiloma, Fr.

35. P. *rubiginosa*, Ach. Thallus membranaceous, suborbicular, not pruinose, livid-glaucous, laciniate-multifid at the circumference; hypothallus indeterminate, tomentose, bluish-black; apothecia reddish-brown, with an incurved, crenate margin. *Fr. Lichenogr. p.* 88. — *β. conoplea*, Fr.; the centre of the thallus passing into a bluish, pulveraceous-granulose crust; 'apothecia symphycarpeous, immersed, convex, granulose-marginate.' *Fr. l. c. P. conoplea, Ach.*

Rocks and trunks. *β* has occurred at the White Mountains; and I have *α* from the South.

36. P. *Russellii*, Tuckerm. Th. orbicular, coriaceous-membranaceous, minutely farinose-granulose, submonophyllous, irregularly radiant, pale-fuscescent-lead-colored; laciniæ somewhat ascendant; hypoth. indeterminate, of very short white fibres becoming lead-colored at the margins; apoth. (central, very numerous) reddish-chestnut and nigres-

cent, with a thick, inflexed, at length rugose, thalline margin. *Tuckerm. Enum. Lich. N. Amer. p.* 50.

Trunks and dead wood; Hingham, *Mr. Russell.* Ipswich, *Mr. Oakes.*

37. P. *Cronia*, Tuckerm. Th. orbicular, membranaceous, smooth, radiant, submonophyllous, dark-bluish becoming pale-lead-colored; laciniæ plane, with elevated, darker margins (beset with elevated, often blackish points, and isidioid branchlets); hypoth. determinate, dark cærulescent.

Rocks among mosses, common on the coast of Massachusetts, and resembling a Collema; infertile. It is very distinct from P. plumbea.

38. P. *lanuginosa*, Ach. Th. membranaceous, white, pruinose; in the circumference lobed and crenate; hypoth. tomentose, bluish-black; apoth. rufous-fuscous, with a pulverulent thalline margin. *Fr. Lichenogr. p.* 88. — *β.* (*granulosa*), Fr.; thallus, at the centre, or mostly, granulose-pulverulent. *Fr. l. c.* — * (*leproso-byssina*); the whole thallus dissolved into a leprous-byssine mass. *Fr. l. c. Lepraria, Ach.*

Rocks in the mountainous districts and on the coast of New England; rarely fertile.

Subsect. V. Psoroma, Fr.

39. P. *microphylla*, Stenh. Scales of the thallus cartilaginous, imbricate, crenate, livid-cinereous, compacted at length into a cinereous crust; hypothallus becoming black; apothecia superficial, disk fuscous-black, finally convex, and excluding the thalline margin. *Fr. Lichenogr. p.* 90. *Lecidea, Ach.*

Rocks in woods, fertile; New England.

40. P. *triptophylla*, Fr. Scales of the thallus membranaceous, livid-fuscescent, at first stellate-expanded, and lacerate-dissected, at length granulose-coralline; hypoth. bluish-black; apoth. somewhat immersed, disk rather plane, rufous-fuscous, margin erect, persistent. *Fr. Lichenogr. p.* 91. — *α. coronata*, Fr.; apoth. produced from the thallus, with a thalline margin, and either simple or symphycarpeous. *Fr. l. c. Lecanora brunnea, Ach. part.* — *β. Schraderi*, Schær.; apoth. produced from the hypothallus, plane, destitute of a thalline margin. *Fr. l. c.* — *γ. corallinoides*, Fr.; crust blackish from the predominant hypothallus, squamules wholly coralline. *Fr. l. c.*

Rocks in woods; New England. New York, *Halsey.* Pennsylvania, *Dill.* Northward to Arctic America, *Rich.*

41. P. *Hypnorum*, Fr. Scales of the thallus minute, imbricate, granulate-crenulate, somewhat yellowish-fuscescent; pale on the under side; apoth. sessile, dilated, disk membranaceous, fulvous-fuscescent, with an elevated, granulose, thalline margin. *Fr. Lichenogr. p.* 98. Icon, *Laur. in Sturm's Fl. t.* 18.

On the earth, growing over mosses and twigs, in alpine districts. White Mountains, frequent upon Salix Uva-Ursi, on Mount Pleasant, &c., fertile. Northward to Arctic America, *Rich.*

Sect. III. Thallus crustaceous, lobate at the circumference, or wholly squamulose and effigurate.

Subsect. VI. Placodium, Fr.

42. P. *straminea*, Wahl. Thallus crustaceous, plicate-radiose, straw-colored; laciniæ convex, teretish, contiguous; apothecia plane, reddish-fuscous, with a tumid thalline margin. *Fr. Lichenogr. p.* 109.

Rocks. Greenland, *Fries.* And elsewhere in Arctic America, *Rich.*

43. P. *saxicola*, Ach. Th. cartilagineous, appressed, areolate-squamulose, pale-greenish; the circumference of somewhat plane, radiose-lobate, concrete laciniæ; apoth. appressed, disk yellowish-fulvous, margin thin, at length crenate. *Fr. Lichenogr. p.* 110. *Lecanora galactina, Ach.*

Rocks and stones, fertile; New England. New York, *Halsey.*

44. P. *chrysoleuca*, Ach. Th. cartilagineous, subfoliaceous, crenate-lobate, greenish-straw-colored; fuscescent on the under side; apoth. appressed, disk golden-fulvous, and dark orange-red, with a thin, flexuous, evanescent margin. *Fr. Lichenogr. p.* 113. *Lecanora rubina, Ach. Squamaria, Hoffm. Tuckerm. Lich. N. E. l. c.*

Rocks, New England. Northward to Arctic America, *Rich.* (Herb. Hook.!).

45. P. *oreina*, Ach. Th. crustaceous-adnate, areolate-verrucose, pale-greenish-straw-colored; at the circumference radiose-lobate, plane, incised, black-marginate; apoth. depressed, disk somewhat tumid, black, margin obtuse, very entire. *Fr. Lichenogr. p.* 113. *P. straminea, var. Ach. Mey. Tuckerm. Further Enum. l. c.*

Rocks, throughout New England; fertile.

46. P. *elegans*, Ach. Th. stellate-radiose, appressed, dark orange-

red, naked on both sides; laciniæ somewhat discrete, linear, convex, contiguous, flexuous; apoth. of the same color, very entire. *Fr. Lichenogr. p.* 114.

Rocks and stones near the sea, fertile; New England. Northward to Newfoundland, *Pylaie*, Point Lake, &c., *Rich.*, and Melville Island, *R. Br.*

47. P. *murorum*, Ach. Th. crustaceous, adnate, contiguous, in the circumference radiose-plicate, pale yellow; white underneath; apoth. sessile, disk naked, dark yellow, with a thin, entire, somewhat flexuous margin. *Fr. Lichenogr. p.* 115. — *β. miniata*, Fr.; th. verrucose, less and more narrowly radiose, naked, vermilion-colored. *Fr. l. c. Lecanora, Ach.*

Rocks and stones near the sea, New England, fertile. — *β*, Pennsylvania, *Muhl.* Arctic America, *Rich.*

Subsect VII. Psora, Fr.

48. P. *molybdina*, Wahl. Thallus crustaceous, areolate-verrucose, radiate-plicate, dark-fuscous; white beneath; laciniæ of the circumference linear; apothecia innate, disk urceolate, blackish-fuscous, marginate, with a tumid thalline margin. *Fr. Lichenogr. p.* 126.

Rocks. Greenland, *Fries.*

49. P. *cervina*, Sommerf. Th. areolate-squamaceous; the scales crustaceous, subpeltate, repand or lobed, from greenish becoming livid-chestnut; on the under side white; apoth. at first immersed, marginate, at length protuberant, disk rufous-fuscous. *Fr. Lichenogr. p.* 127. — *β. squamulosa*, Fr.; th. chestnut-tawny; apoth. naked, thalline margin thin or wanting. *Fr. l. c.*

Rocks. White Mountains. Northward to Arctic America, *Rich.*

50. P. *chrysomelæna*, Ach. (sub Lecanora). Th. crustaceous, areolate, yellow; areolæ flat, submembranaceous, somewhat lobate, here and there discrete; apoth. appressed, disk plane, sanguineous-black, thalline margin elevated, subrugose, at length flexuous. *Ach. Syn. p.* 148.

North America (Pennsylvania?), *Muhl.*, *Ach.*

Sect. IV. Thallus crustaceous, uniform.

Subsect. VIII. Patellaria, Fr.

51. P. *pallescens*, Fr. Crust subtartareous, rugose-granulate, glauces-

cent; hypothallus pale; apothecia tumid, disk plane, pale, innate-pruinose, with an erect, entire, persistent margin. *Fr. Lichenogr. p.* 132. *Lecanora Parella, β. Ach. Lichen pallescens, L. Spec. Pl.* — *β. Parella.* Fr.; crust amylaceous-tartareous, plicate-verrucose, milk-white, disk at length chinky or verrucose. *Fr. l. c. Lecanora Parella, Ach. Lichen Parellus, L. Mant.*

Trunks, rails, stones, &c., ascending to alpine districts. — *β*, rocks near the sea and large lakes. New England. New York, *Torrey.* Pennsylvania, *Muhl.* Northward to Arctic America, *Rich.*

52. P. *tartarea*, Ach. Cr. tartareous, granulate-conglomerate, glaucescent; hypoth. pale; apoth. adnate, disk plane, rugulose, pale-yellowish-flesh-colored, with an inflexed, entire margin. *Fr. Lichenogr. p.* 133. — *β. frigida*, Ach.; hypothallus confused with the thallus; crust at length granulate, whitish; apoth. smaller, reddish-flesh-colored. *Fr. l. c.*

Rocks; *β* incrusting twigs, mosses, lichens, &c., and ascending to alpine districts; New England. New York, *Halsey.* Arctic America, *Grev.* (Pl. W. Greenl.).

53. P. *rubra*, Ach. Cr. subcartilagineous, smoothish, at length granulate-pulverulent, glaucescent; hypoth. pale; apoth. adnate, disk concave, red, with a tumid, inflexed, crenulate margin. *Fr. Lichenogr. p.* 134. *Lecanora, Ach.*

Trunks in mountainous districts; New England. Pennsylvania, *Muhl.*

54. P. *oculata*, Fr. Cr. cartilagineous-tartareous, rugose, uneven, papillose, glaucescent; hypoth. pale; apoth. sessile, concave, disk subfuscous, with an elevated, very entire margin, which is whiter than the thallus. *Fr. Lichenogr. p.* 135. — *β*; thallus isidioid, branched; apoth. becoming black. *Fr. l. c. Isidium oculatum, Ach. Turn. & Borr. Lich. Brit. p.* 103.

Trunks in mountainous districts: White Mountains. Northward to Arctic America, *Rich., Hook.*

55. P. *subfusca*, Fr. Cr. cartilagineous, at first contiguous, smooth, becoming chinky and granulate, glaucescent; hypoth. macular; apoth. adnate, disk plano-convex, subfuscous, whitish within, with an erect margin colored like the thallus. *Fr. Lichenogr. p.* 136 (*excl. P. albella*). — *α. discolor*, Fr.; cr. as above; apoth. regular, disk thickish, always naked (red, rufous, fuscous, or black), margin entire, or at

length rugose. *Fr. l. c. Lecanora subfusca, & L. epibryon, Ach.* — *β. distans*, Fr.; cr. thin; apoth. orbiculate, margin elevated, crenulate, disk thin, pale, at first pruinose, finally naked. *Fr. l. c. Lecanora distans, Ach.*

Trunks, dead wood, rocks, and stones. — *β*, trunks. New England. New York, *Torrey*. Pennsylvania, *Muhl*. Northward to Arctic America, *Rich*.

56. P. *albella*, Ach. Cr. cartilagineous, thin, milk-white; apoth. orbiculate, tumid, pale-flesh-colored, whitish-pruinose, margin very entire, subevanescent. *Ach. Syn. p.* 168. *Fr. Summ. Fl. Scand. P. subfusca, γ. Fr. Lichenogr. p.* 139. — *β. angulosa*, Fr.; apoth. aggregated, angulose-irregular, disk livid-fuscous, glaucous-pruinose, with a flexuous, subpersistent margin. *Fr. Summ. Fl. Scand. P. subfusca, δ. Fr. Lichenogr. p.* 139. *P. angulosa, Ach.*

Trunks; New England. New York (*α* and *β*), *Halsey*.

57. P. *cæsio-rubella*, Ach. Cr. thin, softish, white; apoth. scattered (rather large), disk plane, becoming at length somewhat tumid, pale-reddish and fuscescent, at first cæsious-pruinose, equalling the tumid very entire margin. *Ach. Syn. p.* 267.

Trunks; New England. New York, *Halsey*. Pennsylvania, *Muhl*.

58. P. *atra*, Ach. Cr. cartilagineous, at length granulose-verrucose, glaucescent; hypoth. black; apoth. sessile, disk at length somewhat tumid, polished, very black, within black, with an elevated, persistent, subentire margin. *Fr. Lichenogr. p.* 141.

Rocks and stones; New England. New York, *Halsey*. Pennsylvania, *Muhl*. Arctic America, *Rich*.

59. P. *cinerea*, Fr. Cr. subtartareous, areolate-rimose, glaucous-cinereous; hypoth. black; apoth. innate, disk naked, nigrescent, pale within, with a black, obtuse, subelevated thalline margin. *Fr. Lichenogr. p.* 142. *Urceolaria, Ach.*

Rocks and stones, very common, and passing into many varieties. An ochraceous state (Urceolaria Acharii, Ach.) occurs not uncommonly about mountain streams. New England. New York, *Halsey*. Arctic America, *Rich*.

60. P. *badia*, Fr. Cr. cartilagineous, rimose-areolate, subsquamulose, dark-olive; hypoth. black; disk naked, polished, fuscous-black, with an entire, persistent thalline margin. *Fr. Lichenogr. p.* 147.

Rocks and stones (granite), asce ıding to alpine districts; New England. Arctic America, *Rich.* Areolæ sometimes dispersed and squamaceous, with subimmersed, punctiform (imperfect) apothecia. Such a state, according to Fries, is the Endocarpon smaragdulum of some authors; and a similar one, tinged dark red by the oxide of iron, the Endocarpon Sinopicum, Wahl. The former is common in New England, and occurs in New York, *Halsey.* The latter is frequent on alpine and subalpine rocks on our higher mountains.

61. P. *sophodes*, Ach. Cr. tartareous, verrucose-granulate, from green becoming fuscescent; hypoth. black; disk opake, unpolished, fuscous-nigrescent, thalline margin thick, at length rugulose. *Fr. Lichenogr. p.* 149. *Lecanora*, *Ach.* — *β. exigua*, Fr.; small; crust fuscous-cinerascent; hypoth. obsolete; margins of the apothecia whitish, and disappearing. *Fr. l.* , *Lecanora*, *Ach.*

Trunks and dead wood; New England. New York (*α* and *β*), *Halsey.* Pennsylvania (*α*), *Muhl.* Arctic America (*β*), *Rich.*

62. P. *ventosa*, Ach. Cr. tartareous, rimose-areolate, pale-yellow; hypoth. white; apoth. appressed, at length irregular, disk somewhat convex, dark-brownish-red, with a thin, pale, very entire margin. *Fr. Lichenogr. p.* 153. *Lecanora*, *Ach.*

Alpine and subalpine rocks; White Mountains. Newfoundland, *Pylaie*, and northward to Arctic America, *Rich.*

63. P. *varia*, Fr. Cr. cartilagineous, areolate-verrucose, yellowish-green, becoming ochroleucous; hypoth. smooth, macular; apoth. sessile, disk polished, yellowish-flesh-colored, or discolored, with a thin, erect, entire margin. *Fr. Lichenogr. p.* 156. — *α.* Fr.; apoth. scutelliform, plano-concave, with a persistent, sometimes crenulate, or pulverulent thalline margin. *Fr.! l. c. P. varia*, *Ach.* — *β. symmicta*, Fr.; disk of the apothecia somewhat excluding the paler, very entire margin, from pale-yellowish becoming fuscous. *Fr.! l. c.* — *γ. sepincola*, Fr.; apoth. somewhat immersed, convex, immarginate, from fulvous becoming black. *Fr. l. c. Lecidea*, *Ach.* — *δ. polytropa*, Fr.; crust areolate and granulate; margins of the apothecia pale, entire, somewhat flexuous. *Fr. l. c. Lecidea*, *Ach.*

Dead wood, stones, and trunks; New England. New York, *Halsey.* Pennsylvania, *Muhl.* — *β*, granite rocks in mountainous districts; New England. Arctic America, *Rich.*

64. P. *vitellina*, Ach. Cr. tartareous, granulose-coacervate, dark-reddish-yellow; hypoth. macular, white; apoth. sessile, disk yellow becoming fuscous, margin simple, thin, erect, entire, at length of the same color. *Fr. Lichenogr. p.* 162. *Lecanora, Ach.*

Dead wood and rocks; New England. Pennsylvania, *Muhl.*

65. P. *fulva*, Schwein. (sub Lecanora). Cr. cartilagineous, chinky and granulate-verrucose, sulphureous or pallescent, upon a blackish hypothallus; apoth. sessile, disk reddish-orange, immarginate, with a thick, inflected, at length flexuous margin. *Lecanora fulva, Schwein. in Hals. Lich. N. Y. l. c. p.* 13. *Tuckerm. Lich. N. E. l. c.*

Trunks; New England. New York, *Halsey.*

66. P. *cerina*, Ach. Cr. at first contiguous, at length granulate, cinereous, upon a bluish-black hypothallus; apoth. sessile, disk immarginate, somewhat wax-colored, with a thin, equal, opake, entire thalline margin. *Fr. Lichenogr. p.* 160. *Lecanora, Ach.*

Trunks, rocks, and stones; New England. Pennsylvania, *Muhl.*

Subsect IX. URCEOLARIA, Fr.

67. P. *glaucoma*, Ach., Fr. Crust tartareous, contiguous, rimose-areolate, glaucous-white; hypothallus white; apothecia innate, disk pale-flesh-colored, pruinose, at length convex, and becoming blackish, with a very entire, evanescent thalline margin. *Fr. Summ. Fl. Scand. P. sordida, Fr. Lichenogr. p.* 178. *Lecanora glaucoma, Ach.*

Rocks (especially granite). New York, *Halsey.* Arctic America, *Rich.*

68. P. *verrucosa*, Ach., Fr. Cr. cartilagineous, verrucose, naked, glaucous-white; hypoth. white; disk immersed in the verrucæ, concave, blackish, subpruinose, the proper margin connate with the convex thalline margin. *Fr. Lichenogr. p.* 186. ICON, *Laur. in Sturm's Fl. t.* 21. — *α. Urceolaria*, Fr.; normal. *Urceolaria verrucosa, Ach.* — *β. Pertusaria*, Fr.; verrucæ closed, disk prominent like a black ostiole. *Porina glomerata, Ach.*

Incrusting dead mosses and sticks, in alpine districts; White Mountains.

69. P. *calcarea*, Ach., Fr. Cr. subcartilagineous, areolate-verrucose, glaucescent (often mealy and white); disk immersed in the areolæ, from concave becoming plane, blackish, cæsious-pruinose, with a

thin, at length discrete, entire proper margin; thalline margin somewhat prominent, subentire, or rugose-crenate. *Fr. Lichenogr. p.* 187. *Urceolaria, Ach.*

Limestone, and from this passing to other rocks; New England. New York, *Halsey.*

70. P. *scruposa*, Sommerf. Cr. tartareous, rugose-granulate, glaucous-cinerascent; hypoth. white; apoth. immersed, disk urceolate, cæsious-black, with a connivent, cinerous-blackish proper margin, which is at first covered by the crenate thalline margin. *Fr. Lichenogr. p.* 190. *Urceolaria, Ach.* — *β. bryophila*, Ach.; cr. rugose; apoth. smaller, disk emergent, urceolate, with a contracted mouth, thalline margin subevanescent. *Fr. l. c. Gyalecta, Ach.*

Rocks, stones, dead wood, trunks, and on the earth; New England. — *β* incrusting mosses; Pennsylvania, *Muhl.* Arctic America, *Rich.*

X. THELOTREMA, Ach.

Apothecia subconical-truncate, at length open, urceolate-scutelliform; a discrete, lax, membranaceous, lacerate-dehiscent, interior exciple veiling a rigescent disk. Thallus crustaceous.

T. *lepadinum*, Ach. Disk blackish, at first cæsious-pruinose. *Fr. Lichenogr. p.* 428. *Schær. ! Spicil. p.* 67.

Trunks, somewhat rare; New England. Arctic America, *Rich.* (Herb. Hook.!). Our Lichen, as well as that of Arctic America, agrees with the European; and the species is found also in Brazil (*Eschweiler*).

XI. GYALECTA, Ach., Fr.

Apothecia orbiculate, urceolate, at first closed, then variously dehiscent, the elevated, discrete, colored border of the exciple surrounding the disk. Disk at first included, like a nucleus, and gelatinous, becoming at length open, explanate, indurated. Thallus horizontal, crustaceous, somewhat tartareous.

G. *cupularis*, Schær. Apothecia radiate-dehiscent, urceolate-open; border orbicular, elevated, tumid, pale, disk pale-flesh-colored. *Fr. Lichenogr. p.* 195.

Rocks (especially limestone and sandstone, Fr.) and on the earth. New York, *Halsey.* Pennsylvania, *Muhl.*

Tribe II. LECIDEACEÆ, Fr.

XII. STEREOCAULON, Ach.

Apothecia placed upon a thalline stratum, which forms a more or less evident, evanescent (spurious) thalline margin, becoming plane, with an obscure proper margin, and at length cephaloid and immarginate, solid. Thallus vertical, caulescent, mostly solid (*podetia*), supporting a horizontal, squamulose-granulose thallus, and arising sometimes from a horizontal, adnate, granulose thallus.

The apothecia are often quite those of Parmelia, but they also occur subimmarginate from the first, or with only an obscure proper margin, as observed by Schærer and Eschweiler, and the genus seems properly nearest to Biatora, and related through this to Lecidea. In this view, Cladonia must be taken for the highest type of Lecideaceæ; and the fistulous podetium, analogous certainly (Fr. Lich. p. 14) to the tubulose thallus of some Cetrariæ, and in Cladonia turgida, if I am not mistaken, evidently formed by constriction of the ascending foliaceous thallus of that species, must be considered as indicating a higher rank than the solid podetium; this last being rather a branched *stipe*, as is suggested by a comparisor of Stereocaulon Fibul vith Biatora Byssoides. And, adopting a somewhat wider sense for Eschweiler's remark, that Cladonia unites in itself the horizontal and the vertical thallus, we might, in the point of view that we have chosen, see reason to agree with him that this genus is even the highest development of Lichenose vegetation; or to venture, at least, the suggestion, that no genus, which does not include the horizontal type, should seem to be the most perfect *typical* representative of Lichenes. Fries, from whose profound conclusions we are far from prepared to depart, attributes indeed to Usnea (l. c. pp. 9, 17, 198) the highest rank, and, where he considers the genera as falling into parallel series, he, in this view, assigns the position to Usnea, Stereocaulon, and Sphærophoron. But if there is evidently a distinction between the highest *typical* development and the highest *actually attainable* development, and the former represent the most perfect condition of the plant, or genus, *per se*, as a distinct real or assumed existence in nature, — as the latter is representative of extreme tendencies of the vegetation in question to ascend to a higher than its typical structure, — Usnea, &c., may be taken as representing

the *extreme* development of Lichenes, and Cladonia, or some other genus expressing the horizontal type, as representing their *typical* perfection. — S. *ramulosum*, Ach., a mostly tropical species, with densely fibrillose podetia, and terminal, subglobose apothecia, inhabits North America, according to Acharius and Muhlenberg; but it is probable, only the southern part.

Sect. I. Podetia solid, filamentous within; apothecia normally fuscous.

* Squamules foliaceous, or fibrillose.

† 1. S. *tomentosum*, Fr. Podetia lax, terete, very much branched and the branches somewhat recurved, clothed with a dense, whitish, spongy tomentum; squamules somewhat rounded, incised-crenate (becoming phylloid-granulose), cinereous-cæsious; apothecia minute, lateral, at length globose. *Fr. Lichenogr. p.* 201.

On the earth and stones in the lower regions of the White Mountains, and ascending; fertile. Northward to Arctic America, *Herb. Hook.!*

2. S. *corallinum*, Fr. Podetia lax, a little compressed, very much branched, glabrous (many conjoined at the base into a dense, at first digitate-divergent sod); squamules fibrillose, somewhat digitate-ramose, cinereous-cæsious; apoth. scattered or conglomerate (rather large), finally globose. *Fr. Lichenogr. p.* 201. *S. dactylophyllum, Floerk.!*

Stones, in the lower regions of the White Mountains; fertile.

3. S. *paschale*, Laur. Podetia lax, rather slender, somewhat compressed, very much branched, subglabrous (many commonly crowded thickly together, but not cæspitose-conjoined); squamules phylloid-granulose, crenate, conglomerate, glaucous; apoth. subterminal, dilated, plane. *Fr. Lichenogr. p.* 202. *S. paschale, Ach. part. Lichen paschalis, L. fide Fr.*

Stones, and on the earth in large patches, in the lower regions of the White Mountains; and ascending to alpine districts. Common also on the coast; but the genus is peculiarly montane. The present species was formerly considered as including most of those here described, and the following stations are therefore so far uncertain. New York, *Torrey.* Pennsylvania, *Muhl.* Northward to Canada, *Michaux;* Newfoundland, *Pylaie;* the Saskatchawan, &c., *Rich.;* Greenland, *Gieseke;* and Melville Island, *R. Br.*

4. S. *condensatum*, Laur. Podetia erect, terete, scarcely branched, clothed with a thin, white-incarnate tomentum; squamules roundish, teretish, or confluent, glaucous; apoth. terminal, dilated, plane, subpeltate. *Fr. Lichenogr. p.* 203. *S. Meissnerianum, Floerk. !*

Stones and rocks, in the lower regions of the White Mountains; somewhat rarely fertile. Occurring also in the deliquescent, degenerate state called by Acharius S. Cereolus (Meth. t. 7, p. 1). The horizontal thallus at the base is persistent, and often conspicuous.

** Squamules verrucæform, rounded, or angulate.

5. S. *denudatum*, Floerk. Podetia erectish, terete, somewhat sparingly branched above, below denudate, glabrous; granules roundish, thick, cinerascent, at length almost plane, crenate-lobate; apoth. lateral, minute, somewhat plane. *Floerk. ! D. Lich. p.* 13. *Fr. Lichenogr. p.* 204. *S. glaucescens, Tuckerm. Lich. N. E. l. c.*

Rocks; from Greenland, *Dill.*, to New England, where it is common in mountainous, and ascends to subalpine districts. Southward to Pennsylvania, *Dill.*

6. S. *nanum*, Ach. Podetia erect, slender, fastigiate-ramose, below denudate, above very finely pulverulent; granules verrucæform, minute, greenish-pallescent, floccose; apoth. small, lateral, convex. *Fr. ! Lichenogr. p.* 205.

Fissures of rocks, and on stones, in the lower regions of the White Mountains; fertile.

Sect. II. Pilophoron, Tuckerm. Podetia cartilagineous-subfilamentous, or araneous-fistulous within; apothecia subimmarginate, black.

7. S. *Fibula*, Tuckerm. Crust persistent, appressed, subsquamaceous-granulate, bright green; podetia (solid), erect, terete, simple, somewhat corticate with the green squamaceous granules, at length subdenudate, glabrous; apoth. (lateral, minute, somewhat plane, subimmarginate, and) terminal, mostly solitary, at first depressed-globose, immarginate, at length rather inflated, dark-greenish-nigrescent becoming black.

Moist rocks along streams in mountain forests; White Mountains. Rugose, nigrescent cephalodia (certainly abortive apothecia) occur commonly in the crust, resembling similar ones in S. condensatum. Barren podetia terminated often with powdery green pulvinules, as in S. Cereolus, Ach. Apothecia solid, as in the next, the disk placed upon

a paler stratum. S. Cereolus, as described by Borrer, and figured in E. Bot. Suppl. t. 2667, is certainly very near the present section, and agrees in many respects with the species under notice. The apparent difference of structure in the apothecia of this and of the next species from Cladonia, Stereocaulon, and Biatora is one so anomalous, that I prefer to leave them in this place, to which, indeed, their whole habit would seem to refer them.

8. S. *aciculare*, Tuckerm. Crust persistent, of effuse, roundish, whitish granules; podetia erect, terete, smooth, elongated (fistulous and araneous within), divided at length irregularly into erect, subfastigiate, at length denudate branches; granules verruculose, pale-cinereous; apoth. at first subconical-globose, immarginate, often conglomerate, from dark-greenish-nigrescent becoming black. *Bæomyces*, *Meth. t.* 8, *f.* 4, *dein Cenomyce*, *Ach.* *Cladonia*, *Auct.* *Stereocaulon*, *Mihi*, *Enum. Lich. N. Amer. p.* 52.

On the earth; Northwest Coast, *Menzies!* *Douglas*, in herb. Hook.! Rocky Mountains, *Herb. Hook.!* — New York, *Halsey*. Pennsylvania, *Muhl.* Certainly a congener of the last. Fries remarks incidentally (Lichenogr. p. 242), that the apothecia are almost those of Biatora. Rugose cephalodia, like those of the last, occur also in the crust of this species, and at the bases of the podetia. Sommerfelt (Suppl. Fl. Lapp. p. 126) remarks that these cephalodia occur also in S. paschale, S. corallinum, and S. denudatum.

XIII. CLADONIA, Hoffm.

Apothecia orbiculate, submarginate; becoming at length inflated, cephaloid, and immarginate; empty. Disk open, at length protuberant and reflexed, concealing the proper excipie. Horizontal thallus squamulose-foliaceous or crustaceous, from which arises a vertical, caulescent, cartilagineous, fistulous thallus (*podetia*).

Series 1. *Glaucescentes*, Fr. Podetia greenish-glaucous. Apothecia rufous.

1. C. *alcicornis*, Fr. Thallus cæspitose, subfoliaceous, of palmate-laciniate, crenate, glaucous lobules; podetia elongated-turbinate, somewhat verruculose, glabrous, of the same color; scyphi regular, concavo-plane, crenulate; apothecia rufous. *Fr. Lichenogr. p.* 213. *C. Cornucopiæ*, *Hoffm.* *Tuckerm. Lich. N. E. l. c.*

Sterile, sandy earth; pine woods. North America, *Floerke!* Common in New England, and fertile. Pennsylvania, *Muhl.* Arctic America, *Hook.* Lobes black-fibrillose at the margins, beneath, in the European Lichen, but naked in 'warm, dry places,' according to Floerke, and in sterile soils, according to Fries. I have never found fibrillose specimens of our plant.

2. C. *turgida*, Hoffm. Th. foliaceous, erectish, laciniate, glaucous, branching into fruticulose, ramose, glabrous podetia, of the same color; the scyphiferous ones turgid, obconico-cylindrical; spurious scyphi immarginate, dentate-radiate; apoth. carneo-rufescent. *Fr. Lichenogr. p.* 214. *Floerk.! Clad. p.* 115. *Cenomyce parecha*, *Ach.*

Sterile, moist earth, in mountainous districts, fertile; New England. Pennsylvania, *Muhl.* Arctic America, *Rich.*

3. C. *Papillaria*, Hoffm. Th. crustaceous, papillose-granulate, persistent; podetia ventricose-cylindrical, gibbous, glabrous, simple or much branched, glaucous; the branches fastigiate, undivided at the apices, obtuse; apoth. at length convex, rufous. *Fr. Lichenogr. p.* 245. *Floerk.! Clad. p.* 5. Icon, *Laur. in Sturm's Fl. t.* 22. *Pycnothelia*, *Hook. Br. Fl. Tuckerm. Lich. N. E. l. c.*

Sterile earth in alpine and subalpine districts, White Mountains; fertile. The abnormal state with very short, vesicular podetia, tipped with rufous-fuscous, abortive apothecia, is most common.

Series 2. *Fuscescentes*, Fr. Podetia greenish-fuscous (and cinerascent). Apothecia fuscous.

* *Scyphiferæ*, Fr. Podetia passing into a terminal scyphus, closed with a diaphragm.

4. *C. cæspiticia*, Floerk. Thallus cæspitose, of pale-green, laciniate squamules; podetia very short, glabrous, dilated above (and wanting); apoth. fuscous. *Floerk.! Clad. p.* 8. *Cenomyce*, *Ach. Syn. p.* 247.

Trunks of trees and rocks, fertile; New England. New York, *Halsey.* (Cf. Fr. Lichenogr. p. 218.)

5. C. *pyxidata*, Fr. Th. squamulose; podetia cartilagineous-corticate, at length verrucose, or furfuraceous, green-cinerascent; the scyphiferous ones turbinate; scyphi cyathiform, dilated; apoth. fuscous. *Fr. Lichenogr. p.* 216. *Cenomyce*, *Ach.! Syn. p.* 252. — *β. Pocillum*, Ach.; th. of large, thickened lobules; podetia dilated sensibly

upward from a thick base, verrucose with subsquamaceous granules. *Ach. Lichenogr. p.* 535.

On the earth, &c., very common and variable; New England, and westward. New York, *Torrey.* Pennsylvania, *Muhl.* North to the Saskatchawan, &c., *Rich.;* Greenland, *Gieseke;* and Melville Island, *R. Br.* — *β*, in moist crevices of rocks in the mountains of New England; perhaps the handsomest state of the species. A frequent rail-Lichen (Bœomyces scolecinus, Ach., Pycnothelia scol., Tuckerm. Lich. N. E.) is a degeneration. Infertile states are easily confounded with similar states of several other species.

6. C. *gracilis*, Fr. Th. squamulose; podetia cartilagineous-corticate, polished; scyphi somewhat plane; apoth. fuscescent. *Fr. Lichenogr. p.* 218. — *α. verticillata*, Fr.; podetia shorter, all scyphiferous; scyphi dilated, plane, proliferous for the most part from the centre. *Fr. l. c. C. verticillata, Hoffm. Floerk. ! Clad. p.* 26. — *β. cervicornis*, Auct.; th. of conspicuous, elongated, erectish, naked, dark-green squamules; podetia as in the next, of which this is the macrophylline state. — *γ. hybrida*, Fr.; podetia longer and larger, mostly scyphiferous; scyphi dilated, and commonly proliferous from the margin. *Fr. l. c.* — *δ. elongata*, Fr.; podetia elongated, mostly subulate or furcate; scyphi diminished, somewhat concave. *Fr. ! l. c. Cenomyce gracilis, Ach. Cladonia, Hoffm. Floerk. ! Clad. p.* 30. *Tuckerm. Lich. N. E. l. c. Lichen, L.* — * *vermicularis*, Auct.; podetia papyraceous, prostrate, subulate, subsimple, imperforate, white. *C. vermicularis, DC. C. subuliformis, Hoffm. Tuckerm. l. c.* — ** *taurica*, Auct.; podetia papyraceous, erectish, ventricose, ramose, white. *C. taurica, Hoffm. C. subuliformis, β. taurica, Tuckerm. l. c.*

On the earth, most perfect, and in all the varieties, on high mountains; — *γ* being an alpine state, but descending; and * and ** alpine degenerations.† New England and westward. New York (*α*), *Halsey.* Pennsylvania, *Muhl.* North to Point Lake, &c., *Rich.;* and Greenland, *Gieseke.*

7. C. *degenerans*, Floerk. Th. squamulose; podetia cartilagineous-corticate, irregularly proliferous-ramose (glabrous or granulate-furfuraceous), more or less squamulose-exasperate, green-pallescent, becoming

† "Apothecia lateralia, sparsa, atra, thallo innata, eoque submarginata, apoth. Roccellæ aliquo modo accedentia," were observed by Brown in some Arctic American specimens of * (R. Br. in Parry's First Voy. App. p. 307).

blackish and white-spotted at the base; scyphi irregular, cristate-lacerate; apoth. fuscous. *Floerk.! Clad. p.* 41. *Fr.! Lichenogr. p.* 221. *Cenomyce gonorega, Ach.* — *β*; scyphi digitately divided into fastigiate branches, and becoming carious with age. *Fr. l. c. Cenomyce cariosa, Ach.*

On the earth; common in New England. New York, *Halsey.* Pennsylvania, *Muhl.* (Southward to Virginia, *Dill.*)

8. C. *fimbriata*, Fr. Th. squamulose; podetia cylindrical, the whole membranaceous epidermis deliquescing into a fine, glaucous-candicant dust; scyphi cupulæform with an erect margin; apoth. fuscous. *Fr. Lichenogr. p.* 222. *Lichen fimbriatus, L.* — *α*; podetia short, all scyphiferous; scyphi somewhat dentate; apoth. simple. *Fr. l. c. Dill. Musc. t.* 14, *f.* 8. *Lichen fimbriatus, α, L.* — *β. tubæformis*, Fr.; podetia elongated, mostly scyphiferous; scyphi somewhat entire; apoth. symphycarpeous. *Fr. l. c. Lichen fimbriatus, β, L.* — *γ. radiata*, Fr.; podetia elongated, subulate, or the scyphi proliferous-subulate, or obliterated and radiate-fimbriate. *Fr. l. c. Lichen fimbriatus, γ, L.*

On the earth, common in mountainous districts, and fertile; New England. New York, *Halsey.* Pennsylvania, *Muhl.* Northward to Arctic America, *Rich.*

9. C. *cornuta*, Fr. Th. squamulose; podetia cylindrical, somewhat ventricose, the epidermis cartilagineous and persistent below, membranaceous and becoming powdery-deliquescent above; scyphi narrowed, rather plane, with an incurved, somewhat entire margin; apoth. fuscous. *Fr. Lichenogr. p.* 225. *Lichen cornutus, L.*

Trunks among mosses, dead wood, &c., in the mountains of New England; fertile.

10. C. *decorticata*, Floerk. Th. squamulose; podetia slender, cylindrical, the submembranaceous epidermis separating into furfuraceous scales, pulverulent; scyphi narrowed or obsolete; apoth. fuscous. *Floerk. ! Clad. p.* 10. *Fr. Lichenogr. p.* 226. — *β. symphycarpea*, Fr.; podetia somewhat simple; apoth. symphycarpeous. *Fr. l. c.* — *γ.* (*ramosa*), Fr.; podetia branched, subulate, sterile. *Fr. l. c.*

On the earth, in mountainous districts. White Mountains; fertile. Distinguishable from similar decorticate, symphycarpeous states of C. pyxidata by its pulverulence.

** *Perviæ*, Fr. Podetia not passing into closed scyphi, but the axils

and apices dilated-infundibuliform, or simply perforate in the more slender, much-branched forms.

11. C. *cenotea*, Schær. Th. squamulose, dissected; podetia dichotomous-brachiate, membranaceous-corticate, at length finely glaucous-pruinose; axils and fertile apices dilated, infundibuliform, with incurved margins; 'apoth. sessile, from pale becoming fuscous.' *Fr.! Lichenogr.* (*sub C. brachiata*), *p.* 228. *C. cenotea, Schær. Spicil. p.* 35. *Floerk.! Clad. p.* 135. *Bæomyces dein Cenomyce, Ach.* — *α*; turgid; axils and apices as above. *Fr. l. c.* — *β. furcellata*, Fr.; slender, fruticulose; branches subulate, axils perforate. *Fr. l. c.*

On the earth, in mountainous districts. White Mountains; as yet infertile.

12. C. *parasitica*, Schær. Th. squamulose, narrowly erose-laciniate and granulate-pulverulent; podetia delicate, at length besprinkled with scales and granules, divided above into short, somewhat incrassated branches; apoth. minute (often symphycarpeous), fuscous. *Schær.! Spicil. p.* 37. *Lichen parasiticus, Hoffm. C. delicata, Floerk.! Clad. p.* 7. *C. squamosa, var. delicata, Fr.! Lichenogr. p.* 231.

Decaying logs, common in mountainous districts; New England. Pennsylvania, *Muhl.* (Cf. Fries, l. c.)

13. C. *squamosa*, Hoffm. Th. squamulose, dissected, often somewhat pulverulent; podetia branched, lacunose, at length decorticate, and exasperate with squamaceous granules; axils pervious, denticulate; apoth. cymose, fuscous. *Fr. Lichenogr. p.* 231. — *α. ventricosa*, Fr.; podetia ventricose; axils and apices dilated-infundibuliform. *Fr.! l. c. Cenomyce sparassa, Ach. Cladonia, Floerk.! Clad. p.* 129. — *β. attenuata*, Fr.; podetia more slender, attenuate, axils pervious, apices subulate. *Fr.! l. c.*

On the earth, decaying logs, and stones, most perfect and frequent in mountainous districts; New England.

14. C. *furcata*, Floerk. Th. squamulose, somewhat dissected; podetia dichotomous-fruticulose, cartilagineous-corticate, polished, greenish-fuscous; axils and fertile apices pervious; apoth. pedicellate, from pale becoming fuscous. *Fr. Lichenogr. p.* 229. *Floerk. Clad. p.* 141. — *α. crispata*, Fl.; turgid; axils and apices infundibuliform. *Floerk.! l. c. p.* 148. *Fr.! l. c.* — *β. cristata*, Fr.; somewhat turgid; obliquely dilated and fimbriate-cristate at the axils; the apices cristate-ramulose.

Fr. l. c. Dill. Musc. p. 544, & Icon, *t.* 82, *f.* 1. — *γ. racemosa*, Floerk.; podetia elongated, turgescent, ramose, and, as well as the axils, gaping; branches recurved or erect, fertile ones explanate. *Floerk.! l. c. p.* 152. *Fr.! l. c.* — *δ. subulata*, Floerk.; podetia elongated, more slender, with subpertuse axils; apices of the fertile ones cloven; branches erectish, or also recurved, or divergent. *Floerk.! l. c. p.* 143. *Fr. l. c.* — *ε. pungens*, Ach.; small, cæspitose, very much and intricately branched, fragile, pallescent or whitish-cinereous. *Fr. l. c. C. pungens, Floerk. l. c. p.* 156. *C. rangiformis, Hoffm.*

On the earth, common; most perfect in mountainous regions; New England to Ohio. New York, *Halsey.* Pennsylvania, *Muhl.* — *β.* Pennsylvania, *Dill.* — *ε.* Greenland, *Floerke.*

15. C. *rangiferina*, Hoffm. Th. crustaceous, evanescent; podetia fruticulose, trichotomously and very much branched, somewhat tomentose, cinerascent; axils subperforate; sterile apices nodding, fertile ones erect, cymose; apoth. fuscous. *Fr. Lichenogr. p.* 243. *Floerk.! Clad. p.* 160. — *β. sylvatica*, Floerk.; slender, smoother, pale-straw-colored. *Floerk. Clad. p.* 167. *Fr. l. c.* — *γ. alpestris*, Floerk.; softish, the branches and branchlets very densely thyrsoid-entangled. *Floerk. Clad. p.* 165. *Fr. l. c.*

On the earth, common everywhere, and fertile; New England. New York (*α*, *β*, and *γ*), *Halsey.* Pennsylvania, *Dill.* Northward to Canada, *Michaux;* Greenland, *Gieseke;* and elsewhere in Arctic America, *Rich., R. Br.*

Series 3. *Ochroleucæ*, Fr. Podetia ochroleucous; at length fuscous-cerulescent at the base. Apothecia somewhat livid-flesh-colored, lutescent within.

16. C. *carneola*, Fr. Th. squamulose; podetia membranaceous-corticate, at length finely pulverulent, ochroleucous, becoming fuscous-cerulescent at the base, the scyphiferous ones turbinate; apoth. pale-flesh-colored fuscescent. *Fr. Lichenogr. p.* 233 — *α*; podetia turbinate, all scyphiferous, simple or proliferous. *Fr. l. c.* — *β*; podetia elongated-turbinate, with radiate, subulate prolifications. *Fr. l. c.* — *γ. cyanipes*, Fr.; podetia very long, cylindrical, simple, or the scyph. obliterated and passing into somewhat divaricate, sterilescent branches. *Fr. l. c.* Icon, *Laur. in Sturm's Fl. t.* 13.

On the earth; Arctic America. Greenland, *Fries.*

17. C. *Despreauxii*, Bory ms. Th. evanescent; podetia elongated, slender, cartilagineous-corticate, the epidermis separating below into bluish-white squamules, and becoming above finely granulate (not pulverulent), pale sulphureous, becoming bluish-fuscescent at the base; scyphi narrow, proliferous-radiate, or passing into and obliterated in sterilescent branchlets; apoth. minute, pale-flesh-colored fuscescent. *Cenomyce Despreauxii, Bory, fide schedul. in herb. Berol.*

On the earth in alpine districts. Whi[illegible]ountains. Newfoundland, *Bory !*

18. C. *amaurocræa*, Floerk. Th. crustaceous, evanescent; podetia elongated, slender, polished, somewhat curved-decumbent, pale-straw-colored; apices fuscous-black, those of the sterile podetia subulate, variously branched, of the scyphiferous ones irregularly proliferous-branched; scyphi narrow, oblique, margin dentate-radiate; apoth. pale-flesh-colored fuscescent. *Floerk. ! Clad. p.* 119. *Cenomyce oxyceras, Ach. Syn.*

On the earth in alpine districts. White Mountains, very luxuriant and fertile. Greenland, *Floerke*, and elsewhere in Arctic America, *Rich.*

19. C. *Botrytis*, Hoffm. Th. squamulose; podetia cylindrical, cartilagineous-corticate, verruculose, ochroleucous; somewhat divided into subfastigiate branches; apoth. pale-flesh-colored and pallescent. *Fr. Lichenogr. p.* 234.

On the earth, and decaying logs. New York, *Halsey.*

20. C. *uncialis*, Fr. Th. crustaceous, evanescent; podetia fruticulose, dichotomous, smooth, greenish-straw-colored; axils subperforate; sterile apices erect, blackish, fertile ones digitate-radiate; apoth. at first pale-flesh-colored, fuscescent. *Fr. Lichenogr. p.* 244. *Ach. Syn. p.* 276. *C. stellata, Schær. ! Spicil.* 1, *p.* 42 (*excl.* δ). *Floerk. ! Clad. p.* 171. — α. *humilior;* shorter, more slender, and smooth, somewhat attenuate, the axils often imperforate. *Fr. l. c. Cenomyce uncialis, Ach. Lichenogr. Lichen uncialis, Auct.* — β. *adunca*, Ach.; taller, somewhat turgid, incrassated above; branches short, stellate-patent, the fertile ones cymose; axils gaping. *Ach. l. c. p.* 277. *Fr. l. c.* (α.) *C. biuncialis, Hoffm. C. adunca, Ach. Lichenogr.* — γ. *turgescens*, Schær.; softish, turgid-incrassated, the branches subtruncate, fastigiate. *Schær. Spicil.* 1, *p.* 308. *Fr. l. c.*

On the earth: α, sands, and sterile pine woods (fertile?); — β, in

similar places, fertile; and abundant also in mountainous districts;—γ, alpine and subalpine regions; New England. New York, *Halsey.* Pennsylvania (α and β), *Muhl.* Canada (β), *Michaux.*

21. C. *Boryi*, Tuckerm. Th. (crustaceous) evanescent; podetia turgid, fruticulose, dichotomous, fastigiate-ramose, rugulose becoming reticulate-perforate, pale sulphureous and glaucescent; axils scyphiform, entire, at length cribrose-perforate; sterile apices scyphiform, cristate-dentate, entire becoming cribrose, with fuscous tips; fertile ones somewhat cymose-radiate; apoth. flesh-colored, at length dark-fuscous. *C uncialis, var. reticulata, Russell, in Essex Jour. Nat. Hist. Tuckerm. Enum. Lich. N. Amer. p.* 53, *excl. syn.* —*β. lacunosa;* podetia incrassated, obtusish, lacunose-subperforate, glaucous; axils and apices scarcely scyphiform, sparingly subdentate. *Cenomyce lacunosa, Bory, fide sched. in herb. Berol.*

On the earth, near the sea, fertile; Hingham, Duxbury, *Mr. Russell!* and elsewhere on the coast of Massachusetts, *Dr. Porter! Mr. Oakes!* —*β*, alpine and montane districts, infertile; White Mountains. Monadnoc, *Russell!* Newfoundland, *Bory!* I have endeavoured to point out the features that seem to distinguish this remarkable Lichen from C. uncialis, but it is possible that the conclusion of its original indicator may be correct. The podetia become very turgid, and at length often explanate, measuring in one of my specimens eight lines in diameter at the base, and five where the branches begin. The Newfoundland specimen, and our alpine ones, belong to an apparently sterile, subalpine state of the Lichen.

Series 4. *Coccifer æ*, Fr. Podetia greenish, becoming fulvescent at the base. Apothecia scarlet.

* Podetia cartilagineous-corticate, never finely pulverulent.

22. C. *cornucopioides*, Fr. Th. squamulose; podetia cartilagineous-corticate, from glabrous becoming verrucose or granulate-subpulverulent, yellowish, at length cinereous-green; the scyphiferous ones elongated-turbinate, attenuate below; scyphi cyathiform, dilated; apoth. scarlet. *Fr. Lichenogr. p.* 236. *Lichen cornucopioides, L. Fl. Suec. Cenomyce coccifera, Ach. Cladonia, Hoffm. Floerk.! Clad. p.* 89. *Lichen cocciferus, L. part.* Icon, *Laur. in Sturm's Fl. tt.* 23, 24, 25.

On the earth. Very frequent in mountainous districts, but often infertile; New England. New York, *Torrey.* Pennsylvania, *Muhl.* North to the Saskatchawan, &c., *Rich.*, and Greenland, *Gieseke.*

23. C. *bellidiflora*, Schær. Th. of minute, dissected squamules; podetia cartilagineous-corticate, elongated, ventricose-cylindrical, glabrous, becoming at length densely clothed with dissected squamules, yellowish, at length cinereous-green; scyphi extremely narrow; apoth. (often conglomerate, or symphycarpeous), scarlet. *Fr. Lichenogr. p.* 237. *Schær.! Spicil. p.* 21. *Floerk.! Clad. p.* 95.

On the earth, in alpine districts; White Mountains. Greenland, *Floerke.*

24. C. *Hookeri*, Tuckerm. Th. of rather thick, large, ascendant squamules; podetia cartilagineous-corticate, elongated, cylindrical, glabrous, becoming at length squamulose, sulphur-yellow; scyphi cupuliform; apoth. scarlet.

On the earth; Newfoundland, *Herb. Hook.!* This beautiful species resembles C. deformis in some respects, but belongs to the present subdivision, and seems very distinct from every other scarlet-fruited Cladonia with which I am acquainted. I venture to inscribe it to the illustrious botanist who first proposed a complete survey of the cryptogamy of British America, and who has done more than any other to illustrate it.

25. C. *Floerkiana*, Fr. Th. squamulose; podetia cartilagineous-corticate, cylindrical, slender, glabrous, becoming at length granulate-verrucose or squamose-decorticate, greenish and pallescent, nigrescent at the base; scyphi passing into somewhat digitate, fastigiate branches; apoth. scarlet. *Fr. Lichenogr. p.* 238. *Floerk. Clad. p.* 99. *Lichen digitatus*, *E. Bot. t.* 2439. Icones, *Dill. Musc. t.* 15, *f.* 19, *c. Laur. in Sturm's Fl. t.* 14, *d.*

On the earth, decaying logs, dead wood, and rocks, common and fertile; New England.

** Epidermis of the podetia membranaceous, dissolving into a fine dust.

26. C. *macilenta*, Hoffm. Th. squamulose; podetia cylindrical, slender, membranaceous-corticate above, becoming hoary-pulverulent; scyphi narrow, tubæform with an erect margin, or obsolete; apoth. scarlet. *Fr. Lichenogr. p.* 241. — *α. filiformis*, Fr.; podetia very slender; scyphus narrow, entire, or obliterated by a symphycarpeous apothecium. *Fr.! l. c. C. filiformis, Schær.! Spicil. p.* 19. *Tuckerm. Lich. N. E. l. c. Cenomyce bacillaris, Ach. C. polydactyla, Floerk.!*

Clad. p. 108. — *β. clavata*, Fr.; podetia ventricose, subulate at the apices or branched, substerile. *Fr. l. c.*

On the earth, decaying logs, dead wood, and rocks; common in mountainous districts, and fertile; New England. Pennsylvania, *Muhl.* Ochrocarpous states of this species, in which the bright scarlet of the apothecia is changed to a pale yellow, occur in our mountains, but less frequently than similar forms of C. Floerkiana.

27. C. *digitata*, Hoffm. Th. squamulose; podetia cylindrical, becoming ochroleucous-pulverulent above; scyphi narrowed, with an incurved, entire margin, becoming at length ampliate, and the margin somewhat proliferous-palmate; apoth. scarlet. *Fr. Lichenogr. p.* 240. *Schær.! Spicil. p.* 22. *Floerk.! Clad. p.* 102. *Lichen digitatus*, L. Icon, *Laur. in Sturm's Fl. t.* 15, 16. — *α. platyphyllina;* lobules of the thallus dilated, somewhat entire; scyphi mostly entire. *Fr. l. c.* — *β. microphyllina;* squamules of the thallus rather small; scyphi mostly palmate-ramose. *Fr. l. c.*

Decaying trunks, and moist earth among mosses, in mountainous districts, fertile; New England.

28. C. *deformis*, Hoffm. Th. squamulose; podetia elongated, cylindrical or ventricose, becoming sulphureous-pulverulent above; scyphi somewhat narrow, becoming at length cupulæform and dilated, with an erect, crenate-dentate margin; apoth. scarlet. *Fr. Lichenogr. p.* 239. *Schær.! Spicil. p.* 23. *C. crenulata*, *Floerk.! Clad. p.* 105.

On the earth, common upon mountains, a conspicuous Lichen, fertile; New England. Northward to Arctic America, *Rich.* Greenland, *Floerke.*

29. C. *sulphurina*, Michx. (sub Scyphoph.). Podetia simple, at first very simply and slightly scyphiform, thick, submembranaceous, at length subclavate-elongated, smooth, the apices finally irregularly subdivided, and rimose-perforate, hoary-sulphureous; fertile scyphi small; apoth. confluent, black-fuscous. *Scyphophorus sulphurinus*, *Michx. Fl.* 2, *p.* 328. *Cenomyce*, *Ach. Lichenogr. p.* 557. *Ach. Syn. p.* 265.

On the earth, Canada, *Michaux! Fries.* This is the "Lichen coccíferus; major, Dill. t. 14, f. 6, M," of Michaux's herbarium, the specimens appearing to me, at the time I examined them, to resemble some states of C. deformis. Fries observes incidentally (Lichenogr. p. 237) upon Canada specimens ('specimina authentica Canadensia') of Michaux's Lichen, that the podetia do not become squamulose, that it has

infundibuliform and not true scyphi, and much of the habit of C. uncialis; thus distinguishing it from C. bellidiflora, to which Floerke referred it. It is probable that the "Bæomyces tubulosus, Richard. Canada," of Herb. Willd.! which also appeared to me to resemble C. deformis, belongs to Michaux's species, and in this case the thallus is squamulose, and the podetia are finely pulverulent above. It appears certain that the C. sulphurina of Fries is not the C. Hookeri of this Enumeration. The species is also common in North Carolina, according to Fries, who received his specimens from Schweinitz.

XIV. BÆOMYCES, Fr.

Apothecia from the first globose, immarginate, velate, at length empty and araneous within, the base closely surrounding a stipe. Thallus crustaceous, uniform, protruding fertile stipes, which are destitute of a cortical stratum.

The structure of Bæomyces roseus has been illustrated very minutely by Dr. Küttlinger (Allg. Bot. Zeit. 1845, pp. 577 – 584, & t. vi.).

B. *roseus*, Pers. Crust verrucose, glaucous; stipes short, cylindrical; apothecia subglobose, flesh-colored. *Fr. Lichenogr. p.* 246.

Sterile clay-soils, and sands; New England; and abundant also on the sterile surfaces of slides in the White Mountains. New York, *Torrey.* Pennsylvania, *Muhl.*

XV. BIATORA, Fr.

Apothecia margined at first by a waxy thalline exciple converted into a proper exciple, becoming at length hemispherical or globose, subimmarginate, solid, and cephaloid. Disk at length dilated, turgid, concealing the paler margin, placed upon a stratum oftener paler, never coal-black. Thallus horizontal, arising from a hypothallus, somewhat crustaceous, effigurate, or uniform. Podetia wanting, but the apothecia stipitate in a few species. The margin of the apothecia never originally black. *Fr.*

Sect. I. Thallus squamose, or lobed at the circumference.

* Apothecia sessile.

1. B. *decipiens*, Fr. Scales of the thallus discrete, somewhat peltate, angulate, dark-flesh-colored; beneath and at the circumference

white; apothecia marginal, adnate, somewhat immarginate, blackish, white within. *Fr. Lichenogr. p.* 252. *Lecidea, Ach. Syn. p.* 52.

On the earth, especially in alpine districts. Arctic America, *Rich.* Pennsylvania, *Muhl.*

2. B. *globifera*, Fr. Th. squamose, imbricate, greenish-chestnut, somewhat shining; scales reniform, rugose, lobate; apoth. elevated, globose, somewhat immarginate, from rufous becoming black, whitish within. *Fr. Lichenogr. p.* 255. *Lecidea, Ach. Syn. p.* 51. Icon. *Laur. in Sturm's Fl. t.* 26.

Clefts and depressions of rocks. North America, *Ach.* Pennsylvania, *Muhl.* New York, *Halsey.*

3. B. *rufo-nigra*, Tuckerm. Th. squamose, imbricate, from pale rufous becoming blackish; scales irregularly suborbiculate, ascending, crenate-lobate; apoth. adnate, plane, obtusely margined, atrorufous, at length convex, black. *Placodium sp. nov. Tuckerm. Lich. N. E. l. c.* 1838.

Rocks; near Boston. Scales of the thallus small, obscure to the naked eye.

4. B. *atro-rufa*, Fr. Th. crustaceous, smoothish, adnate, at first contiguous, becoming at length areolate, cinereous-fuscescent; black beneath; at the circumference foliaceous-lobate; apoth. applanate-adnate, rufous-fuscous, whitish within. *Fr. Lichenogr. p.* 255. *Lecidea, Ach. Lichenogr. p.* 200.

On the earth in alpine districts. White Mountains.

** Apothecia stipitate, margin at length revolute.

5. B. *placophylla*, Fr. Th. subcrustaceous, orbicular, corrugated, glaucous-virescent, at the circumference foliaceous, lobes rounded, and crenate; white beneath; apoth. stipitate, pileiform, rufous-fuscous; stipes thick, compressed, longitudinally rugulose. *Fr. Lichenogr. p.* 257. *Bæomyces, Ach. Meth. p.* 323, *&* Icon, *t.* 7, *f.* 4. *Lich. Univ. p.* 574.

On sandy, sterile earth; slides, and banks of streams, in the White Mountains.

6. B. *Byssoides*, Fr. Th. crustaceous, effuse, granulose, greenish, glaucous, squamulose at the circumference; hypoth. fibrillose, white; apoth. substipitate, pileiform, from flesh-colored becoming fuscous

stipes rather short, somewhat compressed, corticate with the ascending granules of the crust or naked, often subdivided at the apex. *Fr. Lichenogr. p.* 257. *Bæomyces rupestris, Ach. Lich. p.* 573. *B. rufus, Wahl. B. Byssoides, Schær.* — *α.* Fr.; granules of the crust subsquamaceous, crenulate (and deliquescent), greenish-glaucous. *Fr. l. c.* — *β. rupestris*, Fr.; cr. thin, smoothish, subcontiguous (or powdery); apoth. smaller. *Fr. l. c. Bæom. rupestris, Pers.* — *γ. lignatilis*, Fr.; cr. rugose, cinereous-glaucescent; apoth. subsessile, fuscous-black. *Fr. l. c. Bæom. lignorum, Pers.*

Common in mountainous districts: *α*, sterile sandy and clayey soils; slides, banks of streams, and road-sides, in the mountains of New England. — *β*, rocks in mountain forests, New England. New York, *Halsey.* — *γ*, decaying wood, in similar situations with the last, apothecia almost sessile. The three varieties occur often in close neighbourhood at the White Mountains. This species, Stereocaulon Fibula, and S. aciculare illustrate the connection of Stereocaulon with the sessile Biatoræ. The difference of structure, indicated by Fries as generically distinguishing Bæomyces roseus from this and the last species, referred to Bæomyces by Acharius, has been further illustrated by Dr. Küttlinger in Allg. Bot. Zeit. 1845, l. c.

Sect. II. Thallus effuse, uniform.

7. B. *icmadophila*, Fr. Crust tartareous, granulate, greenish-glaucous; hypothallus white; apothecia (large) softish, incarnate, exciple cupular, with a thin, evanescent margin. *Fr. Lichenogr. p.* 258. *Lecidea, Ach. Bæomyces, DC.*

Decaying wood in mountain forests, and on the earth; ascending to alpine districts; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Arctic America, *Rich.* Apothecia sometimes a little stipitate in ours, as in the European Lichen.

8. B. *vernalis*, Fr. Cr. of minute, glaucescent granules, arising from a membranaceous, whitish hypothallus; apoth. at length subglobose, clustered, flesh-colored, and fulvous-ferrugineous. *Lecidea vernalis, Borr. in Hook. Br. Fl.* 2, *p.* 183. *L. luteola, Ach.*

Trunks in mountain forests, growing over mosses; New England. New York, *Halsey.* Arctic America, *Rich.*

9. B. *pineti*, Fr. Cr. very thin, granulose, greenish-glaucescent; apoth. (minute) sessile, whitish; disk becoming at length yellowish-

flesh-colored, finally falling out and the apothecia urceolate. *Lecidea. Ach. Syn. p.* 42. *Hook. Br. Fl. l. c. Biatora, Fr. Summ. Fl. Scand.*

Scales of fir-bark, and on the earth. Pennsylvania, *Muhl.*

10. B. *sanguineo-atra*, Fr. Cr. thin, membranaceous, effuse, whitish-cinerous, becoming granulose; apoth. sanguineous, with an obscure paler margin, at length black. *Fr. Summ. Fl. Scand. B. vernalis, β. sanguineo-atra, Fr. Lichenogr. p.* 263.

Trunks and rocks, growing over mosses, in mountainous districts; New England.

11. B. *carneola*, Fr. Cr. confused with the hypothallus, cartilagineous-membranaceous, glaucescent, at length granulate-pulverulent; apoth. sessile, concave, naked, from reddish-flesh-colored becoming fuscous, exciple cupular, with an elevated, at length evanescent, paler margin. *Fr. Lichenogr. p.* 264. *Lecidea, Ach.*

Trunks; New England. New York, *Halsey.* Apothecia somewhat larger in my specimens than in the European Lichen.

12. B. *spadicea*, Ach. (sub Lecid.). Cr. cartilagineous-membranaceous, granulate, glaucescent; apoth. thick, margin very finely rugulose, at length somewhat convex and excluding the margin, light-chestnut becoming blackish, within of the same color. *Lecidea spadicea, Ach. Syn. p.* 34.

Trunks; Pennsylvania, *Muhl., Ach.* Southward. Fries considers this scarcely distinct from the last. (Lichenogr. p. 264.)

13. B. *cinnabarina*, Sommerf. Cr. confused with the hypothallus, cartilagineous, uneven, glaucous becoming whitish; apoth. appressed, cinnabar-red, naked, becoming at length convex, and immarginate. *Fr. Lichenogr. p.* 266. *Lecidea, Sommerf. Vet. Ac. Handl.* 1823 (*e Fr.*).

Trunks. Greenland, *Fries. Lecidea coccinea, Schwein. in Hals. Lich. N. Y. l. c.* 1824, which cannot, by the description, be distinguished from this, occurs in New York, *Halsey*, and appears to extend to N. Carolina! (*Mr. Curtis*).

14. B. *chlorantha*, Tuckerm. Cr. of discrete, subsquamaceous-verrucose granules, bright green, and white within (or deliquescent sorediiferous); apoth. somewhat elevated, becoming plane, and at length convex, with a thick, flexuous, paler margin; within white; disk nigrescent.

Bark of Pinus Strobus, and other trees; New England. Resem-

bling Lecidea enteroleuca, but with a different crust, and, I think, the apothecia of the present genus.

15. B. *decolorans*, Fr. Cr. tartareous, confused with the hypothallus, areolate-granulose, glaucescent; apoth. appressed, naked, from flesh-colored becoming fuscous and black, with a thin, elevated, paler margin; finally convex and irregular, and the margin disappearing. *Fr. Lichenogr. p.* 266. *Lecidea, dein Lecanora granulosa, Ach. Lecidea decolorans, Floerk. Ach. Syn.*

On the earth, and decaying wood, in mountainous regions; New England. Northward to Arctic America, *Rich.*

16. B. *anomala*, Fr. Cr. confused with the white hypothallus, at length granulose, white-cinerascent; apoth. becoming hemispherical-globose, somewhat hyaline-livid, at length fuscescent and black, margin very thin, evanescent. *Fr. Lichenogr. p.* 269. *Lecanora commutata, Ach. Syn. p.* 149.

Trunks, dead wood, &c. New York, *Halsey.* An obscure species. Nomen omen. *Fr.*

17. B. *mixta*, Fr. Cr. cartilagineous, confused with the hypothallus, rugose-verrucose, milky-glaucescent; apoth. adnate, exciple annular, disk at first plane, pruinose, flesh-colored or livid, becoming at length turgid, fuscous, and black, and excluding the obtuse margin. *Fr.! Lichenogr. p.* 268. *Lecidea anomala, Ach. part. Tuckerm. Lich. N. E. l. c.*

Trunks, and dead wood. New England.

18. B. *porphyritis*, Tuckerm. Cr. subcartilagineous, smooth, chinky, at length rugose, glaucescent (and greenish-sorediiferous); white within; apoth. elevated on a white thalline stratum which constitutes an evanescent spurious margin, or sessile; disk at first somewhat plane, pruinose, with a thick, elevated margin, at length convex, and excluding the margin, fuscous-nigrescent.

Trunks, in the mountains of Massachusetts and New Hampshire. Near to B. mixta, but as that is one of the smallest, this is the largest Biatora that I am acquainted with. Several apothecia sometimes occupy the same thalline stratum, as in B. ochrophæa and B. aurantiaca. With age the apothecia become flexuous, and very large, a single exciple having sometimes a diameter of two lines.

19. B. *ochrophæa*, Tuckerm. Cr. subcartilagineous, thickish, gran-

ulate-verrucose and somewhat plicate, glaucescent; hypoth. pale; apoth. elevated-subpedicellate on a thalline stratum, which constitutes a thick, subcrenulate, at length evanescent spurious margin; disk plane, delicately pruinate, at length convex, and excluding its thin elevated, proper margin, from pale flesh-colored becoming blackish-fuscous.

Trunks in the mountainous districts of Northern New England common. Apothecia at first closed, and either sessile (when some states resemble Parmelia carneo-lutea, Turn.) or elevated on a protuberant thalline stratum, at length lacerate-dehiscent and becoming plane with a thick, crenulate thalline margin, which disappears, leaving the marginate disk. It has often all the aspect of a Parmelia, not a little resembling P. rubra. Is the structure of the apothecia in the last-mentioned species, and in P. carneo-lutea, wholly diverse from the structure above described of the present?

20. B. *russula*, Tuckerm. Cr. subcartilagineous, rimose-areolate and granulate, glaucescent (often greenish-sorediiferous); apoth. elevated on a thalline stratum which constitutes a thick, mostly entire spurious margin, becoming convex, and excluding the obscure proper margin, fuscous-reddish. *Lecidea, Ach. Syn. p.* 10. *Lecanora, Feé, Crypt. Exot. p.* 116.

Trunks of cedars on the coast of New England. Pennsylvania. *Muhl.* Extending to the tropics.

21. B. *rivulosa*, Fr. Cr. tartareous, mouse-colored and paler, covering a fuscous-black hypothallus, which often decussates the crust; apoth. produced from the crust, from pale-fuscous becoming blackish; whitish within, with a thin margin. *Fr. Lichenogr. p.* 271. *Lecidea, Ach. Lecanora falsaria, Ach.*

Rocks, especially in mountainous districts; New England. Pennsylvania, *Muhl.* Northward to Arctic America, *Rich.*

22. B. *exigua*, Chaub. Cr. of minute, confluent granules, smooth, cartilagineous, cinereous-greenish; decussated by lines of the black hypothallus; apoth. submarginate, from pale-yellowish becoming fuscous. *Fr. Lichenogr. p.* 278. *Lecidea varians, Ach. Syn. p.* 38. *Tuckerm. Lich. N. E. l. c. L. versicolor, Schwein. in Hals. Lich. N. Y. l. c.?*

Smooth bark; New England. New York, *Halsey?* Pennsylvania. *Muhl.*

23. B. *quernea*, Fr. Cr. deliquescent, granulose-farinose, fuscescent-ochroleucous; hypoth. black; apoth. immersed, convex, brown, at length immarginate. *Fr. Lichenogr. p.* 279. *Lecidea, Ach.*

Trunks; New England.

24. B. *lucida*, Fr. Cr. granulate, greenish-yellow, at length deliquescent and ochroleucous; hypoth. white; apoth. (minute), convex, pale yellow, often excluding the paler margin. *Fr. Lichenogr. p.* 279. *Lecidea, Ach.*

Stones and decaying wood. Arctic America, *Rich.*

25. B. *aurantiaca*, Fr. Cr. cartilagineous, uneven, somewhat granulate, lutescent; innate in a black hypothallus; apoth. somewhat elevated on a thalline stratum which constitutes a crenulate, evanescent, spurious margin, disk dark-orange (and fuscescent), with a thin proper margin. *Parmelia, Fr.! Lichenogr. p.* 165. *Lecidea, Ach. Borr. in Hook. Br. Fl.* 2, *p.* 186. *Lecanora salicina, Ach.*

Trunks, dead wood, and rocks; New England. New York, *Halsey.* Pennsylvania, *Muhl.* Arctic America, *Rich.*

26. B. *fusco-lutea*, Hook. (sub Lecid.). Cr. thin, effuse, smooth, somewhat granulose, whitish; apoth. somewhat elevated, plane, yellowish, at length rufous-fuscous, pruinose, with a thin margin. *Lecidea, Hook. in Rich. l. c. Lichen fusco-luteus, Dicks. E. Bot. t.* 1097.

Upon mosses; Arctic America, *Rich.* Fries suspects this to be a state of B. ferruginea. It does not seem to be the Lecidea fusco-lutea, *a*, of Ach. Syn.

XVI. LECIDEA, Ach., Fr.

Apothecia margined at first by a very black, carbonaceous, proper exciple, becoming scutelliform or hemispherical, solid. Disk at first punctiform-impressed, always open, oftener horny, and placed upon a carbonaceous stratum. Thallus horizontal, arising from a hypothallus, somewhat crustaceous, effigurate, or uniform. Apothecia very black the first, the margin never, and the disk rarely, otherwise colored. *Fr.*

Sect. I. Thallus effigurate at the circumference, or wholly rugose-plicate.

1. L. *candida*, Ach. Crust rugose-plicate, candicant, becoming at length white-farinose, lobed at the circumference; hypothallus black;

apothecia appressed, obtusely marginate, glaucous-pruinose, white within. *Fr. Lichenogr. p.* 285.

On the earth upon mosses; Arctic America, *Rich.*

2. L. *vesicularis*, Ach. Cr. bullate-plicate, somewhat caulescent, from greenish becoming glaucous, radiculose at the base; apoth. free, peltate, obtusely marginate, at first pruinose, finally convex, naked; white within. *Fr. Lichenogr. p.* 286.

On the earth in alpine districts; Arctic America, *Rich.*

3. L. *Wahlenbergii*, Ach. Cr. suborbicular, gyrose-plicate, round-lobed at the circumference, from green becoming bright-yellow; hypoth. black; 'apoth. arising between the areolæ, obsoletely marginate, naked, black within.' *Fr. ! Lichenogr. p.* 291. Icon, *Laur. in Sturm's Fl. t.* 28.

Moist sides and crevices of rocks in alpine districts. On the Great Haystack, New Hampshire, infertile. Arctic America, *Rich.*

4. L. *flavo-virescens*, Fr. Cr. determinate, areolate-appressed, plicate, lobulate at the circumference, from greenish becoming yellow; apoth. adnate, with a thin margin, becoming at length convex, and excluding the margin, black within. *Fr. Lichenogr. p.* 291. *L. scabrosa, Ach. Meth.*

On the earth in mountainous districts, often in company with Biatora Byssoides; White Mountains. According to Borrer (in Hook. Br. Fl. 2, p. 178), L. citrinella, Ach., is the true Lichen flavo-virescens of Dickson, and the present species should bear the name given it by Acharius. Compare Fries, l. c.

Sect. II. Thallus effuse, uniform.

Subsect. I. Areolatæ, Fr. Crust innate, originally areolate or becoming so. Hypothallus black.

* *Saxicolæ.*

5. L. *albo-cærulescens*, Fr. Cr. at first contiguous, from bluish becoming whitish; apoth. produced from the crust, margin of the annular exciple thin, disk waxy, black, cerulescent-pruinose, white within. *Fr. Lichenogr. p.* 295. *L. pruinosa, Ach. Tuckerm. Lich. N. E. l. c.* — *β. immersa*, Fr.; cr. very thin, whitish, disappearing; apoth. small, oftener immersed in the rock. *Fr. l. c. L. immersa, Ach.*

Rocks and stones, especially granite and mica-slate; New England.

New York, *Halsey*. Pennsylvania, *Muhl.* — β, limestone; New York, *Torrey*. Pennsylvania, *Muhl.*

6. L. *contigua*, Fr. Cr. at first contiguous, glaucous-white; apoth. produced from the crust; disk thick, horny, very black, at first glaucous-pruinose, with a thick, discrete, plano-cupular, obtusely marginate, carbonaceous exciple. *Fr. Lichenogr. p.* 298.

Rocks and stones (granite), and often tinged ochraceous by the oxide of iron, in the mountains of New England.

7. L. *variegata*, Fr. Cr. at length areolate, glaucescent; the black, somewhat fimbriate hypothallus here and there prominent; apoth. produced from the crust, depressed, at first and often persistently glaucous-pruinose, black within; disk from urceolate becoming explanate, and dilated, with a persistent, at first thin, coarctate, at length obtusish margin. *Fr. Lichenogr. p.* 303.

Maritime granite rocks; Arctic America, *Fries*.

8. L. *lapicida*, Ach. Cr. at length areolate-verrucose, from glaucous becoming cinereous-white; apoth. superficial, produced from the cortical layer, sessile, not pruinose, horny and cinerascent-black within, with an even, naked disk, and a thin, at length flexuous margin (or, the margin disappearing, finally confluent and irregular). *Fr. Lichenogr. p.* 306.

Rocks and stones (granite), in mountainous districts; New England. New York, *Halsey*. Pennsylvania, *Muhl.* Arctic America, *Rich.*

9. L. *atro-alba*, Ach. Cr. somewhat areolate (the areolæ commonly discrete, verrucæform), opake, fuscous, and grayish-white; apoth. produced from the hypothallus, (small,) the obtuse margin scarcely discrete from the naked, at length somewhat umbonate disk. *Fr. Lichenogr. p.* 310.

Rocks and stones (granite); New England. New York, *Halsey*. The crust variable, and often nearly obsolete.

10. L. *panæola*, Ach., Fr. Areolæ of the crust verrucose, gray, variegated with rufescent tubercles; apoth. produced from the hypothallus; exciple cupular, with a persistent, obtuse margin; disk always plane, very black, cæsious-pruinose, white within. *Fr. Lichenogr. p.* 314. — β. *obscurata*, Fr.; areolæ thinner, applanate, somewhat contiguous, fuscescent. *Fr. l. c. L. obscurata, Schær.! Spicil. p.* 130. *Tuckerm. Lich. N. E. l. c.*

Rocks and stones in mountainous districts; White Mountains.

11. L. *fusco-atra*, Fr. Areolæ of the crust cartilagineous, applanate olivaceous-fuscescent and fuscous, angulate, smooth and somewhat polished (or becoming dull and pallescent); apoth. produced from the hypothallus, appressed; disk plane, at first cinereous-pruinose, at length naked, with a thin, somewhat acute, at length flexuous margin; but the margin disappearing with age, and the apothecia often finally heaped and conglomerate. *Fr. Lichenogr. p.* 316. *L. fumosa, Ach. L. athrocarpa, Ach.*

Rocks and stones in mountainous districts. New England. New York, *Halsey.* Arctic America, *Rich.*

12. L. *confluens*, Schær. Cr. rimose-areolate, opake, cinerascent smoke-colored; apoth. produced from the crust, appressed, somewhat contiguous (often confluent); margin not elevated, obtusish; disk always naked, very black, within cinerascent. *Schær.! Spicil. p.* 141. *Fr. Lichenogr. p.* 318.

Rocks and stones in mountainous and alpine districts; New England. New York, *Halsey.* Arctic America, *Rich., Hook.*

13. L. *Morio*, Schær. Areolæ of the crust verrucose, shining, of a yellowish-copper-color, radiant at the circumference; apoth. produced from the thick, determinate, black hypothallus, minute, depressed, plane, becoming gyrose-plicate with age; margin thin; disk always naked, black within. *Fr. Lichenogr. p.* 319. *Schær. Spicil. p.* 133.—*β. coracina*, Schær.; crust (from the predominance of the hypothallus) cinerascent-black. *Schær.! l. c. Fr. l. c.*

Rocks in alpine and subalpine districts; White Mountains.

14. L. *geographica*, Schær. Cr. of somewhat confluent, bright-yellow areolæ; apoth. produced from the hypothallus, blackish within, margin of the cupular exciple thin; disk naked. *Fr. Lichenogr. p.* 326. *Schær.! Spicil. p.* 124. — *α. atro-virens*, Schær.; areolæ verrucæformi, scattered in the hypothallus; apoth. immixed. *Fr. l. c. Schær. l. c.*—*β. contigua*, Schær.; areolæ applanate, confluent in a somewhat contiguous, chinky crust; apoth. immersed. *Fr. l. c. Schær. l. c.* — *γ. alpicola*, Schær.; areolæ applanate, coalescent and large, somewhat rugose, interruptedly covering the hypothallus; apoth. innate. *Fr. l. c. Schær. l. c.*

Rocks and stones (granite and mica-slate), in alpine and subalpine districts, and at lower elevations, in the mountains of New England. Newfoundland, *Pylaie.* Northward to Arctic America, *Rich.*

** *Corticolæ.*

15. L. *premnea*, Ach. Cr. glaucescent, softish, deliquescing and leprous, obliterating the hypothallus; apoth. elevated; exciple cupular, with an obtuse margin; disk horny, very opake, and obsoletely black-pruinose, white within. *Fr.! Lichenogr. p.* 329. *Patellaria leucoplaca, DC. Fl. Fr.* 2, *p.* 347 (*e Fr.*).

Trunks and rails; New England. New York, *Halsey.*

16. L. *parasema*, Fr. Cr. somewhat leprous, glaucescent, becoming at length verrucose-areolate, somewhat limited by the black hypothallus; apoth. sessile, opake; exciple cupular, with a thin margin; disk horny, naked, very black. *Fr. Lichenogr. p.* 330. *L. punctata, Floerk.! D. Lich. n.* 81. *Schær.! Helv. n.* 197–199.

Trunks, and degenerant on dead wood; New England. New York, *Halsey.* Pennsylvania, *Muhl.* Arctic America, *Rich.* A most common and widely diffused species, but all black apothecia with a thin or without any crust are not to be referred to it. *Fr.* Compare Borr. in Hook. Br. Fl. 2, p. 176.

17. L. *enteroleuca*, Fr. Cr. at first contiguous, glaucescent, deliquescing and leprous, somewhat limited by the black hypothallus; apoth. adnate; exciple annular, with a thin margin; disk somewhat waxy (often hyaline or cerulescent), whitish within. *Fr.! Lichenogr. p.* 331. — *β. olivacea*, Fr.; cr. yellowish-virescent; apoth. often irregular and rugose, ærugineous-black. *Fr. l. c. L. elæochroma, Ach. Syn.*

Trunks; New England. New York, *Halsey.* Pennsylvania, *Muhl.*

Subsect. II. Granulosæ, Fr. Crust at length becoming somewhat granulose. Hypothallus white.

18. L. *sanguinaria*, Ach. Granules confluent in a tartareous crust, glaucescent; hypoth. white; apoth. superficial, naked, at length convex; exciple annular; disk placed upon a blood-red stratum. *Fr. Lichenogr. p.* 335.

Trunks, decaying wood, and stones, in mountainous and subalpine districts; New England. New York, *Halsey.*

19. L. *albo-atra*, Schær. Cr. areolate-verrucose, glaucous-white, often somewhat tartareous and mealy; hypoth. white; apoth. (small) innate-protuberant, at first coronate with the crust, cæsious-pruinose, coal-black within, with a thin, evanescent margin. *Fr. Lichenogr. p.*

336. *Schær. Spicil. p.* 140: *Borr. in Hook. Br. Fl.* 2, *p.* 180. *L. corticola, Ach. Syn.*

Trunks on the coast of New England. New York, *Halsey.* Pennsylvania, *Muhl.*

20. L. *dolosa*, Wahl. Cr. somewhat verrucose, greenish-glaucous, oftener leprous and white; apoth. (minute) depressed; exciple cupular, with a very thin margin; disk very black, nearly naked, often punctate-scabrous, cinereous-blackish within. *Fr. Lichenogr. p.* 337. *L. pinicola, Sommerf. Suppl. Fl. Lapp. p.* 153. *L. pinicola, Borr. in Hook. Br. Fl.* 2, *p.* 176? *Tuckerm. Lich. N. E. l. c.*

Scaly bark of old pines; New England.

21. L. *melancheima*, Tuckerm. Cr. cartilagineous, areolate-verrucose, becoming somewhat lobulate, glaucous-white, confused with the hypothallus; apoth. appressed, somewhat plane, disk equalling the very thin margin, at length convex, scarcely excluding the margin, very black, polished, and shining.

Trunks; and very common on rails on the coast of Massachusetts (Ipswich, *Mr. Oakes*, Lynn, Hingham, &c.), and occurring on dead wood at the White Mountains. Disk sometimes a little pallescent, but the margin always very black.

22. L. *sabuletorum*, Fr. Cr. cartilagineous, at first contiguous, becoming rimose-areolate, granulate and somewhat lobulate, cinerascent or fuscous, confused with the hypothallus; apoth. produced from the crust, horny; exciple annular, with an evanescent margin; disk naked, often fuscescent. *Fr. Lichenogr. p.* 339. *Lichen s. Lecidea muscorum, Auct. quorund.*

On the earth, decaying wood and mosses, stones, and trees, ascending to alpine districts; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Arctic America, *Rich.*

23. L. *arctica*, Sommerf. Granules of the crust cartilagineous, at first discrete, papillæform, persistent, fuscescent-cinereous; apoth. immixed, somewhat immarginate, cæsious-pruinose, horny and cinerascent within. *Fr. Lichenogr. p.* 342. *Sommerf. Suppl. Fl. Lapp. p.* 156.

Upon mosses in alpine districts; White Mountains.

24. L. *milliaria*, Fr. Granules of the crust at first discrete, fuscous, and cinereous-white, often deliquescent and leprous; apoth. produced among the granules, globose, somewhat immarginate, naked; exciple

cupular; disk at length rugulose and tuberculate, blackish within. *Fr. Lichenogr. p.* 342. — *α. terrestris*, Fr. — *β. saxatilis*, Fr. — *γ. lignaria*, Fr.! *Lichen dubius*, *E. Bot. t.* 2347 (*e Fr.*). *L. dubia*, *Turn. & Borr. in Hook. Br. Fl.* 2, *p.* 176. *Tuckerm. Lich. N. E. l. c.*

On old rails (*γ*), common; New England.

Tribe III. GRAPHIDACEÆ, Fr.

XVII. UMBILICARIA, Hoffm.

Apothecia superficial; an originally closed thalline exciple converted into a carbonaceous proper exciple, becoming more or less open, of various form. Disk horny, ascigerous, at length chinky, or gyrose-plicate, with an incurved margin. Thallus horizontal, cartilagineous, foliaceous, somewhat monophyllous, affixed by a central point.

This most natural genus can, perhaps, still be retained in the place given it in the *Lichenographia Europæa*, though I have, in pursuance of Fries's suggestion (l. c. p. 347), confirmed by all the observations that I have been able to make, preferred to alter the generic character, and make it indicate more fully the relations of the group. It appears to me as analogous to Biatora as to Sticta; and as the former genus is considered to indicate a Lecideaceous type, irrespective of its approximations to Parmelia, so Umbilicaria may perhaps be taken as typically representative of a peculiar (perhaps properly lirellæform, or Graphidaceous) type, irrespective of the approach which some of the species make to the characters of Parmeliaceæ.

Sect. I. PATELLATÆ. Apothecia orbiculate-patellæform; disk at length chinky, plicate, or proliferous-papillate.

1. U. *mammulata*, Ach. (sub Gyroph.). Thallus membranaceous, smooth, irregularly round-lobed and somewhat crenate, fuscous-nigrescent; on the under side very black, papillose-granulate, and fibrillose; apothecia elevated, orbiculate; margin rather thick; disk plane, chinky, becoming at length convex, and proliferous-papillate. *Gyrophora mammulata*, *Ach. Syn. p.* 67. *G. mamillata*, *Muhl. Catal. p.* 105.

Rocks. Pennsylvania, *Muhl.* (North Carolina, *Mr. Curtis!*) Very distinct from the next.

2. U. *Pennsylvanica*, Hoffm. Th. coriaceous-membranaceous, papulose, dark-fuscous; on the under side papillose-granulate and nigrescent; apoth. elevated, orbiculate; margin rather thin; disk plane, but becoming at length convex, cloaky, and plicate. *Hoffm. Pl. Lich.* 3, *p.* 5, & *t.* 69, *f.* 1, 2. *Lecidea, Ach. Meth. p.* 86. *Gyrophora, Ach. Lichenogr. p.* 227. *Ach. Syn. p.* 67. *Hook. in Rich. App. Frankl. Narr. p.* 759. *U. pustulata, Michx.! Fl.* 2, *p.* 322, *non Hoffm.*

Rocks. Mountains of Pennsylvania, *Muhl.* New York, *Halsey.* New England, common, and fertile. Canada, *Michaux!*

3. U. *pustulata*, Hoffm. Th. coriaceous, papulose, cinerascent; on the under side smooth, and reticulate-lacunose; apoth. appressed, orbiculate-patellæform, somewhat simple; margin obtuse. *Fr. Lichenogr. p.* 351. *Hook.! Br. Fl.* 2, *p.* 219. *Gyrophora, Ach.* — *β. papulosa*, Tuckerm.; apoth. at length subpedicellate, irregularly proliferous-papillate, excluding the margin. *Gyrophora papulosa, Ach. Lich. Univ. p.* 226. *Ach. Syn. p.* 67. *U. lævis, Pers.* (*ex Ach.*). *Gyroph. bullata, Willd. herb.!*

Rocks. *α*, New York, *Halsey.* — *β*, Nova Scotia, 'used for dyeing reds and browns'; Gov. Wentworth, 1795, *Herb. Smith!* Newfoundland, *Bory* in herb. Kunth! New York, *Torrey.* Pennsylvania, *Muhl.!* New England, common and fertile, and ascending to alpine districts, where it is often smaller, thicker, and glaucous-pruinose. It does not seem to afford any constant characters to distinguish it from the European Lichen but the luxuriant development of the apothecia. In the var. papillata, Hampe! a Cape of Good Hope Lichen, the apothecia are papillate, and perhaps also by a proliferous growth of the patellæform apothecium; but this variety, though in other respects resembling ours, is distinct from it. The small, fruticulose tufts almost characterizing this species in Europe, which I have also observed in the Swedish U. vellea, are generally wanting in the American plant, which is almost always normal and fertile.

4. U. *anthracina* (Schær.), Fr. Th. coriaceous, not papulose, black; on the under side smooth and black-pruinose; apoth. elevated, orbiculate-patellæform, simple; margin tumid, disk somewhat plane and even. *Fr. Summ. Fl. Scand. U. atro-pruinosa, Schær. in Ser. Mus.* (*cit. Fr.*). *Fr. Lichenogr. p.* 351. *Lecidea, Schær.! Spicil.* 1, *p.* 104. *Lichen anthracinus, Wulf.* — *α*; th. smooth and even above. *Schær. l. c. Fr. l. c.* — *β. tessellata*, Schær.; th. above finely rimose-areolate or punc-

tate-verrucose, rugose at the central point. *Schær. l. c. Fr. l. c.* — *γ. reticulata*, Schær.; th. reticulate-rugose above. *Schær. l. c. Fr. l. c.*

Rocks in alpine districts. *α*, Newfoundland, ***Bory*** in herb. Willd.! — *γ*, Bear Lake, and elsewhere in Arctic America, *Hook.!* (Parry's Sec. and Third Voy.).

5. U. *polyphylla*, Hoffm. Th. coriaceous-cartilagineous, smooth, corrugated, fuscous-black; on the under side very black and glabrous; 'apoth. sessile, at first patellæform, marginate, becoming at length convex, and concentrically plicate.' *Fr. Lichenogr. p.* 352. *Gyrophora, Hook.! Br. Fl.* 2, *p.* 217. *Lichen, L. Gyrophora glabra, Ach.* — *β. deusta*, Fr.; th. thinner, furfuraceous-flocculose; somewhat lacunose and paler on the under side. *Fr. l. c. Umbilicaria deusta, Hoffm. Gyrophora, Ach. Lichen, L.*

Rocks on mountains; *α*, alpine; — *β*, descending. White Mountains, infertile. Northward to Newfoundland, *Pylaie*, and Greenland, *Herb. Banks!*

6. U. *proboscidea*, DC., Stenh. Th. submembranaceous, reticulate-rugose, olivaceous-fuligineous; on the under side pale and fibrillose; apoth. somewhat elevated, orbiculate-patellæform, becoming at length convex, very gyrose, or proliferous-papillate, somewhat excluding the margin. *Fr. Lichenogr. p.* 354. *Gyrophora, Ach. Hook.! Br. Fl.* 2, *p.* 219. — *β. tornata*, Ach.; th. indurated, complicated, plicate-rugose; obsoletely fibrillose beneath. *Ach. Syn. p.* 65. *Hook. in Rich. l. c. p.* 758, & Icon, *t.* 30, *f.* 4. — *γ. arctica*, Ach.; th. incrassated, rugose; glabrous beneath. *Ach. l. c. Fr. l. c.*

Alpine and subalpine rocks. White Mountains; and Chin of Mansfield in the Green Mountains, fertile. Northward to Arctic America, *Rich.*

7. U. *cylindrica*, Ach. (sub Gyroph.). Th. subcoriaceous, rigid, smoothish, livid, cinereous-pruinose, ciliated with elongated, rigid, ramose, black fibres (or naked); on the under side somewhat pale-ochroleucous; apoth. pedicellate, orbiculate-patellæform, plane, becoming at length hemispherical, gyrose-plicate, scarcely excluding the margin. *Gyrophora cylindrica, Ach. Hook.! Br. Fl.* 2, *p.* 218. *Lichen, L. U. proboscidea, β, Fr. Lichenogr. p.* 356.

Alpine rocks. A single specimen from Bear Lake, *Herb. Hook.!*

is perhaps referable to this species, which has escaped notice, but probably occurs within our limits.

8. U. *hirsuta*, Ach. (sub Gyroph.). Th. coriaceous, softish, pulverulent, cinerascent and white; on the under side from pale-fuscous becoming blackish, very hirsute with large, softish, at first pale, branched fibres (at length subfibrillose-scabrous and black); apoth. marginal, appressed, becoming patellæform, and at length convex, and subglobose, gyrose-plicate, with a thin margin. *Gyrophora hirsuta*, *Ach.! Syn. p.* 69. *U. vellea*, *γ. hirsuta*, *Fr. Lichenogr. p.* 358.— *β. depressa*; th. at length rigid; apoth. somewhat impressed, plane, with a thick margin. *U. vellea*, *β. depressa*, *Fr. l. c. U. depressa*, *β. spadochroa*, *Schær. Tuckerm. Lich. N. E. l. c.* (*sub Gyroph. spadochroa*).

Rocks. Common in mountainous, and ascending to alpine districts, New England, fertile. Northward to Arctic America, *R. Br.* The New England Lichen does not appear to differ from those of Sweden and Switzerland, unless, perhaps, in attaining to a larger size, and, like the foreign ones, is near the U. vellea of Sweden, which differs in its tumid-marginate, papillate apothecia. Of the last species I have not seen American specimens, unless, with Schærer, and in accordance also with the earlier view of Fries, we consider the present species as a variety of it.

9. U. *Dillenii*, Tuckerm. Th. coriaceous, rather rigid, smooth, from glaucous-fuscescent becoming dark-fuscous; on the under side black and closely hirsute with short, black, crowded fibres (or lacerate, and papillose-scabrous); apoth. convex, at first orbiculate and concentrically plicate, becoming at length lirellate, with a thin (canaliculate) margin. *Lichenoides coriaceum latissimo folio*, *&c.*, *Dill. Musc. p.* 545, *& t.* 82, *f.* 5. *U. vellea*, *Michx.! Fl.* 2, *p.* 323, *& Auct. Amer.*

Rocks. Paiqualian Mountain, New Jersey, *J. Bartram* (Dill.). Canada, *Michaux!* Newfoundland, *Herb. Montagne!* Pennsylvania! *Muhl.* New York, *Torrey.* Very common in New England, and fertile. The apothecia are often abortive (very small, and forming sometimes a continuous black crust); but in a single specimen from the White Mountains they are perfect, and agree with the minute description in Michaux, whose Lichen was certainly the same with that of Dillenius. The species is widely diffused in North America, and preserves its peculiar features from Newfoundland to the Alleghanies of Pennsylvania; contrasting in this respect with the more limited and

northern U. hirsuta. It was considered certainly distinct, in 1841, by Montagne. Linnæus cites the figure of Dillenius under his Lichen vellereus, and his description includes also U. hirsuta, the differences in the apothecia being disregarded; but the specimen that I saw in the Linnæan herbarium was the L. vellea of Sweden, which I have collected abundantly in that country, and which seems to me very distinct from the present.

Sect. II. LIRELLATÆ. Apothecia somewhat lirellæform, becoming at length angulate-patellate, or finally crowded together in a hemispherical, subimmarginate, lireilate tubercle.

10. U. *hyperborea*, Hoffm. Th. coriaceous-membranaceous, papulose-rugose, dark-olivaceous-fuscous, and blackish; on the under side lacunose, smooth, and fuscous-nigrescent; apoth. appressed, originally somewhat lirellæform, at length angular, substellate-multiform, plicate and papillate, with an apparent margin. *Fr. Lichenogr. p.* 353. *Gyrophora*, *Ach. Floerk.! Berl. Mag. cit. Fr.*

Alpine and subalpine rocks (and perhaps a flocculose state, *β. deusta*, Enum. Lich. N. Amer., descending), White Mountains; Chin of Mansfield and other of the Green Mountains, fertile. Arctic America, *Rich.* Rocky Mountains, *Herb. Hook.!* In separating this section of the genus from the other, I have endeavoured to indicate the features of difference that seem, at the first view, to distinguish the lirellate from the patellate apothecia; but I am uncertain how far the proposed characters are constant. The ternary division, incidentally proposed by Fries (Lichenogr. p. 349), suggested the present; but my present acquaintance with the species has not enabled me to adopt the former entire.

11. U. *erosa*, Hoffm. Th. cartilagineous, rigid, cribrose-reticulate, at length rugulose, dark-fuscous-nigrescent; on the under side papillose-granulate, subfibrillose-lacerate in somewhat anastomosing ridges, dark-fuscous and cinerascent; apoth. originally somewhat lirellæform, at length patellate, becoming convex and gyrose-plicate, and finally substellate-multiform, and immarginate. *Fr. Lichenogr. p.* 354. *Schær.! Spicil. p.* 93.

Alpine rocks. White Mountains, fertile. Newfoundland, *Pylaie.* Northward to Arctic America, *R. Br.*, *Hook.* Northwest Coast, *Menzies!*

12. U. *Muhlenbergii*, Ach. (sub Gyroph.). Th. coriaceous-cartila gineous, somewhat lacunose-reticulate, olivaceous-fuscous; on the un der side papillose-granulate, lacerate in anastomosing ridges, fuscous cinerascent; apoth. somewhat sunk, originally lirellæform, at leng composite, stellate-multiform, crowded finally into a convex, immarg nate tubercle. *Gyrophora, Ach. Lichenogr. p.* 227. *Syn. p.* 67. *Hook in Rich. l. c. p.* 758. — *β. alpina*, Tuckerm.; smaller, thickened, an complicated. *Lich. N. E. l. c.*

Rocks. Lancaster, Pennsylvania, *Muhl.!* New York, *Halse* New England, common and luxuriant on the coast. Northward Newfoundland, *Bory* in herb. Kunth! and Arctic America, *Rich.* — *β*, alpine rocks, White Mountains. The descriptions by Sprengel (Sys IV. pp. 262, 263) of this species and of U. Pennsylvanica seem t have been transposed.

13. U. *angulata*, Tuckerm. Th. coriaceous-cartilagineous, ver rigid, smooth, and somewhat polished, becoming dark-fuscous and n grescent; on the under side very black, papillose-granulate, lacera at the centre, with paler fibres; apoth. somewhat impressed, original sublirellæform, becoming angulate-patellate, lirellate, and at leng convex, with an obtuse margin.

Rocks. (California, *Menzies!*) Northwest Coast, *Herb. Hook.* Perhaps nearest to U. Dillenii, the apothecia at length resembling thos of that species.

XVIII. OPEGRAPHA, Humboldt.

Apothecia somewhat lirellæform, elongated, margined by a free carbonaceous, proper exciple. Disk canaliculate, at first closed b the inflexed-connivent margin, becoming open, indurated, and horny Thallus crustaceous.

The Graphideæ proper, excluding Umbilicaria, constitute a peculi subtribe, which attains to its full development only in the tropics; passin there into several genera not found elsewhere. Eschweiler (System & Lich. Brasil. in Mart. Fl. Bras.), Chevallier (Histoire des Graph dées), and Fée (Essai sur les Cryptogames des Écorces Exotiques O ficinales) have illustrated these genera, which are probably represent in our Southern States, where also several remarkable species of th present genus, inhabiting the South of Europe and extending north as fa as the warmer parts of England (Borrer), may be expected to occu

Sect. I. Apothecia superficial, destitute of a thalline margin.

1. O. *varia*, Pers., Fr. Crust somewhat leprous, indeterminate (rarely innate in the matrix); apothecia superficial, tumid; margins of the entire exciple at length distant, becoming thin, or disappearing; disk somewhat plane, at first subpruinose, blackish within. *Fr. Lichen-gr. p.* 364. *O. cymbiformis, Schær. ! Spicil.* 1, *p.* 50. — *α. pulicaris*, Fr.; apoth. rather elliptical; disk a little concave, margin inflexed. *Fr. l. c. O. vulvella, Ach.* — *β. notha*, Fr.; apoth. rounded; disk turgescent, and often obliterating the margin. *Fr. l. c. Opegrapha, Ach. Graphis curvula, Ehrh. Tuckerm. Lich. N. E. l. c.* — *γ. signata*, Fr.; apoth. elongated; disk broad, plane, margin evanescent. *Fr. ! l. c. Opegrapha, Ach. Lichen hebraicus, Hoffm. O. cymbiformis, var. hebraica, Schær. ! Spicil. p.* 330, *part.* — *δ. diaphora*, Fr.; apoth. elongated, both ways rather attenuated; margin somewhat persistent. *Fr. l. c. Opegrapha, Ach.*

Thick bark of oaks and other trees, and degenerant on dead bark and wood, and stones; New England. New York (*α* and *β*), *Halsey.* Pennsylvania (*α* and *β*), *Muhl.*

2. O. *atra*, Pers., Duf. Cr. innate in the matrix; apoth. emergent-superficial, slender, shining, acute; margin of the somewhat entire exciple thin; disk linear, canaliculate, naked, horny within. *Fr. Lichen-gr. p.* 366. — *α. stenocarpa*, Fr.; apoth. very long, semicylindrical, flexuous; discrete, or reticulate-anastomosing, or maculæform and irregular. *Fr. l. c. Schær. ! Spicil. p.* 48. *O. stenocarpa, denigrata, vulgata, & epipasta, α, Ach.* — *β. abbreviata*, Fr., apoth. abbreviated, irregular, often radiately disposed. *Fr. l. c. O. depressa, & O. epipasta, γ, δ, Ach.* — *γ. macularis*, Fr.; apoth. dilated into somewhat radiate, immarginate maculæ, and confluent. *Fr. ! l. c. Arthonia asteroidea, & A. Swartziana, Ach.* — *δ. siderella*, Fr.; cr. fuscescent; apoth. acute, opake, somewhat innate and here and there erumpent. *Fr. l. c. Opegrapha, Ach. O. rufescens, α. rubella, Schær. ! Spicil. p.* 50 (*e Fr.*).

Smooth bark of trees; New England. New York (*α* and *γ*), *Halsey.* Arctic America (O. epipasta, *β*), *Rich.*

3. O. *herpetica*, Ach., Fr. Cr. innate in the matrix, at length erumpent, and verruculose; apoth. emergent, elliptical or obtusely lanceolate, opake (somewhat ocellate or marginate by the white thalline verrucæ); margins of the entire exciple thin; disk canaliculate, naked,

horny within, becoming tumid, and covering the margin. *Fr.! Lichen. ogr. p.* 368.

Bark of oaks, and other trees, New England.

4. O. *abnormis*, Ach. Cr. thin, softish, white; apoth. immersed very slender, short or very long, flexuous, confluent, rugose-crisped opake, black; disk and margin somewhat confluent and indistinct. *Ac. Syn. p.* 74.

Hard bark of trees; Pennsylvania, *Muhl.*, *Ach.* A mostly tropical species growing on Cascarilla, and other bark.

Sect. II. GRAPHIS. Apothecia erumpent, coronate for the most part with a thalline margin.

5. O. *scripta*, Ach., Schær. Cr. innate in the matrix, becoming at length exposed, uneven, and pulverulent; apoth. immersed, erumpent with a raised accessory thalline margin; the proper margin tenuescent smooth; the disk linear, at first cæsious-pruinose. *Fr. Lichenogr. p.* 370. *Schær.! Spicil. p.* 46. — *α. limitata*, Schær.; apoth. emergent scattered irregularly, various. *Fr. l. c. Schær. l. c.* — *β. recta*, Schær. apoth. immersed, straight, parallel, disk somewhat dilated. *Fr. l. c. Schær. l. c. O. recta, Humb. O. Cerasi & betuligna, Ach.* — *γ. serpentina*, Schær.; apoth. immersed, flexuous, very long, the thalline margin tumid, evanescent. *Fr. l. c. Schær. l. c. O. serpentina, Ach.*

Bark of trees; New England. New York (*α*, *β*, and *γ*), *Halsey*. Pennsylvania (*α* and *β*), *Muhl.*

6. O. *polymorpha*. Cr. somewhat pulverulent, whitish-cinerascent or very white; apoth. somewhat rounded or oblong, irregular, without apparent proper margin, from plane becoming tumid and elevated punctate, angulose, repand, or somewhat stellate-ramulose, cæsious-pruinose, with a more or less conspicuous thalline margin. *Arthonia polymorpha, Ach. Syn. p.* 7. *Feé Crypt. Exot. p.* 53. *Eschw. Lich. Bras. l. c. p.* 111. *O. Cascarillæ, Floerk.! herb.* (*fide ips.*).

North America (Pennsylvania ?), *Muhl.* A common Lichen of Cascarilla bark, which Eschweiler (l. c.) has illustrated at length. The arrangement of Muhlenberg's catalogue leaves it probable that he considered it to occur within our limits.

7. O. *inusta*, Ach. (sub Graph.). Cr. membranaceous, somewhat rugulose, pale-virescent, decussated by black lines; apoth. minute, immersed, rather short, straight, simple or somewhat stellate-ramose, ob-

nse, plano-concave, naked; the proper margin very thin, entire, concrete, with a thicker, elevated, thalline margin. *Graphis inusta*, *Ach. Sm. p.* 85.

Bark of Prinos verticillata, Canada, *Kalm.* (Ach.). In this variable genus, long observation is essential to any correct settlement of the species. The present appears to be wholly unknown here.

XIX. LECANACTIS, Eschw.

Apothecia immersed, rounded-irregular and lirellæform, always open, the cupular, carbonaceous, proper exciple connate with the thallus, which constitutes sometimes an accessory margin. Disk horny, somewhat plane, never connivent, veiled at first by the pruinose thallus, and bordered by the erect margin of the exciple. Thallus crustaceous.

L. *impolita*, Fr. Cr. tartareous, contiguous, chinky, glaucescent; apoth. immersed, dilated, maculæform, obscurely fuscous, glaucous-pruinose. *Fr. Summ. Fl. Scand. Arthonia*, *Borr. in E. Bot. Suppl.* t. 2692. *Parmelia*, *Fr. Lichenogr. p.* 183. *Lichen*, *Ehrh. Arthonia pruinosa*, *Ach.*

Trunks. Pennsylvania, *Muhl.*

Tribe IV. CALICIACEÆ, Fr.

XX. TRACHYLIA, Fr.

Apothecia sessile, discrete from the thallus, orbiculate. Disk somewhat compact, ascigerous, margined by the innate, carbonaceous, proper exciple, or the exciple obsolete. Asci oblong. Thallus crustaceous.

This genus, for which I am not able to furnish a complete character, is distinguished from the other genera of the tribe by the sporidia being contained in *asci*. Several of the species have also a peculiar habit, quite different from that of the true Calicia.

1. T. *tigillaris*, Fr. Crust areolate-verrucose, bright greenish-yellow; apothecia innate; the disk originally naked, black, equalling the tumid margin. *Calicium*, *Turn. & Borr. Lich. Brit. p.* 132. *Fr. Lichenogr. p.* 400. *Trachylia*, *Fr. Summ. Fl. Scand.*

Old rails and pales, and also on trunks. New England. New York, *Halsey.* Arctic America, *Rich.*

2. T. *stigonella*, Fr. Parasitical; exciple cupular, innate, black; the disk plane, black-pulverulent, equalling the thin, erect, black margin. *Calicium*, *Ach. Syn. Fr. Lichenogr. p.* 401. *Trachylia*, *Fr. Summ. Fl. Scand.*

(Crust of Pertusaria pertusa, var. coccodes; Fr.) Pennsylvania, *Muhl.* New York, *Torrey.*

XXI. CALICIUM, Pers., Fr.

Apothecia crateriform; a carbonaceous proper exciple margining a compact or powdery disk, composed of coacervate, naked sporidia. Thallus crustaceous.

Eschweiler's (Lich. Bras. l. c. p. 61) reference of the Calicia to Fungi seems, so far as I can venture an opinion on his observations, hardly satisfactory. The crustaceous thallus, though often, from various causes, deficient, exists normally in every species, except the parasitical and doubtful C. turbinatum; and the structure of the exciple connects the genus, together with the related Trachylia and Coniocybe, closely with Lecideaceæ, *quasi*, to use Fries's expression, *Lecidinarum degeneratio præcipitata.*

Sect. I. Apothecia stipitate.

* *Glaucescentia*, Fr. Exciple more or less whitish-cinereous-pruinose.

1. C. *viride*, Pers. Crust granulose, yellowish-green; stipes somewhat elongated, black; apothecia turbinate-lentiform, whitish-cinereous beneath; the disk plane. *Fr. Lichenogr. p.* 386.

Decaying wood in mountain forests; New England.

2. C. *lenticulare*, Ach. Cr. somewhat tartareous, rugose-granulate, grayish-white; stipes straight, thick, rigid, black; apoth. lentiform, whitish-cinereous beneath; the disk plano-convex. *Fr. Lichenogr. p.* 386. *C. clavellum*, *Turn. & Borr. Lich. Brit. p.* 138. *C. claviculare*, *Ach. part.* Icon, *E. Bot. t.* 1465.

Decaying wood, common in mountain forests; New England. New York (C. claviculare), *Halsey.* Arctic America (C. clavic.), *Rich.*

3. C. *curtum*, Turn. & Borr. Cr. filmy, whitish; stipes short, thick, firm, very black; apoth. turbinate-cylindrical, with a coarctate, whitish margin; the disk becoming at length protruded-prominent. *Turn. &*

Borr. Lich. Brit. p. 148. *Fr.! Lichenogr. p.* 387. Icon, *E. Bot. t.* 2503.

Decaying wood in the New Hampshire mountains. The protruded "disk often as long as the capitulum itself, and in the latter case giving the pilidium a miniature resemblance to a painter's brush." Lich. Brit.

4. C. *subtile*, Pers., Fr. Cr. filmy, leprous, white-glaucescent; stipes filiform, flaccid, black; apoth. lentiform-globose, naked, black; the margin at length reflected. *Fr.! Lichenogr. p.* 388. *C. debile, Turn. & Borr. Lich. Brit. p.* 151. Icon, *E. Bot. t.* 2462.

Decaying wood. Dead trees from which the bark has fallen in mountain forests; New England. Arctic America, *Rich.* Apothecia at first white-pruinose. Fr.

5. C. *trichiale*, Ach. Cr. of pale, squamulose, crenate granules; stipes commonly slender, elongated; apoth. turbinate, and, at length, from the swelling of the yellowish-brown disk, subglobose, white-cinereous beneath. *Fr.! Lichenogr. p.* 389. *Sch[illegible]! Spicil. p.* 5.

Rough bark of trees, as of hemlock; an[illegible] decaying wood; New England.

** *Fuscescentia*, Fr. Apothecia more or less ferrugineous.

6. C. *phæomelanum*, Tuckerm. Cr. of scattered, dissected squamules, green (and fuscescent); apoth. subsessile, ferrugineous-fuscous, at length black; the powdery, black disk at length surpassing the tumid, smooth margin.

Fir-bark in the New Hampshire mountains, common. I should most readily compare this with Trachylia tympanella, Fr., from which it differs in its slightly stipitate apothecia, &c. It is very unlike any European Calicium that I am acquainted with, but I think must be referable to the genus.

7. C. *hyperellum*, Wahl. Cr. somewhat tartareous, granulose, greenish-yellow; stipes elongated, thick, firm, dull brownish-black; apoth. lentiform, ferrugineous beneath; disk brownish-black. *Fr.! Lichenogr. p.* 389. *Turn. & Borr. Lich. Brit. p.* 140. Icon, *E. Bot. t.* 1832.

Decaying wood in the mountains of New England.

8. C. *trachelinum*, Ach. Cr. filmy, somewhat smooth, grayish; stipes elongated, slender, firm, ferrugineous-fuscous, becoming at

length black; apoth. turbinate-lentiform, rufous-ferrugineous beneath, at length, together with the disk, blackish. *Fr.! Lichenogr. p.* 390. *C. sphærocephalum, Turn. & Borr. Lich. Brit. p.* 153.

Decaying wood, and on trunks; New England. New York, *Halsey.* The stipes sometimes branched in this, as in C. subtile, and other species.

9. C. *melanophæum*, Ach., Fr. Cr. granulate-conglomerate, milk-white; stipes rather short, black; apoth. turbinate-globose, black and shining beneath, as is also the inflexed margin; disk pulverulent, ferrugineous-brown and nigrescent. *Fr.! Lichenogr. p.* 391. *Sommerf. Lapp. p.* 179.

Decaying wood in the New Hampshire mountains. The crust deficient in my specimens, but the apothecia appear to me like those of the Swedish Lichen. Sommerfelt remarks that he has gathered it but rarely, and is uncertain whether it is any thing else than a variety of the last, to which Fries also originally referred it.

10. C. *brunneolum*, Fr. Cr. very thin, smooth, whitish; stipes elongated, very slender, often branched, black; apoth. (small) turbinate-globose, dark-yellowish-ferrugineous; the disk of the same color, obliterating the margin of the exciple. *Fr.! Lichenogr. p.* 393. *C. parietinum, Schær.! Spicil. p.* 4.

Decaying wood in the mountainous districts of New England.

*** *Flavo-virescentia*, Fr. Apothecia yellowish-pruinose.

11. C. *chrysocephalum* (Turn.), Ach. Cr. granulate-conglomerate, bright greenish-yellow; stipes slender, often elongated, black, with often a greenish tinge; apoth. turbinate-lentiform, yellow-pruinose; the disk light-brown. *Turn. & Borr. Lich. Brit. p.* 143. *E. Bot. t.* 2301. *Fr. Lichenogr. p.* 393.

Rough bark of hemlock and other trees, and on decaying wood; New England.

12. C. *phæocephalum*, Turn. & Borr. Cr. of discrete, crowded, at length squamulose and crenate, fuscescent granules; stipes slender, blackish-fuscous; apoth. turbinate-lentiform, greenish-yellow-pruinose; disk dark-fuscous. *Turn. & Borr. Lich. Brit. p.* 145. *Fr. Lichenogr. p.* 394. — *β*; cr. less perfect. *Fr.! l. c. C. roscidum, β. Schær. Tuckerm. Enum. Lich. N. Amer. p.* 55. Icon, *E. Bot. t.* 1540.

Decaying wood (*β*), Arctic America, *Rich.* (Herb. Hook.!).

Sect. II. Apothecia sessile; without crust; parasitical.

13. C. *turbinatum*, Pers. Parasitical; exciple from globose becoming turbinate, sessile, free, shining-black, the disk impressed, with a thickish, inflexed margin. *Fr. Lichenogr. p.* 402. *C. sessile*, *DC. Turn. & Borr. Lich. Brit. p.* 128. Icon, *E. Bot. t.* 2520.

On the crust, and in the verrucæ of Pertusaria pertusa, Ach. New England. New York, *Torrey*. Pennsylvania, *Muhl.*

XXII. CONIOCYBE, Fr.

Apothecia stipitate, spherical, suberose, without margin, bursting at the apex and becoming at length entirely pulverulent, and concealing the proper exciple. Thallus crustaceous.

C. *nigricans*, Fr. Crust very thin, leprous, white; stipes naked, from whitish becoming black; apothecia globose, naked, black. *Fr. Lichenogr. p.* 384.

Rough bark of hemlock and rock-maple; New England. It is with hesitation that I refer our plant to the European species, though it appears to agree with a specimen from Flotow. The genus is at once distinguishable from the other genera of the tribe, and several other species, as C. *furfuracea*, with yellow-pulverulent apothecia, and C. *pallida*, with pale, white-pruinose apothecia, not improbably occur with us.

Div. II. ANGIOCARPI, Schrad., Fr.

Tribe I. SPHÆROPHORACEÆ, Fr.

XXIII. SPHÆROPHORON, Pers.

Apothecia terminal, spherical, the thalline exciple at first closed, becoming at length lacerate-dehiscent. Nucleus globose, within cottony-cartilagineous, without powdery with naked, black sporidia. Thallus vertical, fruticulose, crustaceous-cartilagineous without, solid within.

1. S. *compressum*, Ach. Thallus fruticulose, whitish, irregularly branched, compressed, fibrillose-ramulose; apothecia globose-depressed,

at length disciform, with a reflexed margin. *Fr. Lichenogr. p.* 404. *Turn. & Borr. Lich. Brit. p.* 115. Icon, *E. Bot. t.* 114.

Rocks and on the earth in alpine districts. Canada, fertile, *Herb. Hook.!* Arctic America! *Rich.*

2. S. *globiferum* (L.), DC. Th. fruticulose, somewhat terete, with erectish, fibrillose-ramulose branches, chestnut; apoth. globose, with an inflexed margin. *DC. Fl. Fr. Lichen globiferus, L. S. Corallo-des, Pers. Fr. Lichenogr. p.* 405. *Turn. & Borr. Lich. Brit. p.* 110 (*excl. β*). Icon, *E. Bot. t.* 115.

On the earth in alpine and subalpine districts; and descending northward. White Mountains, fertile. Eastport, Maine, *Russell!* Newfoundland, *Pylaie.* Arctic America, *Hook. !*

3. S. *fragile*, Pers. Th. densely cæspitose, fruticulose, dichotomously branched, somewhat cinereous; branches terete, fastigiate, naked; apoth. turbinate-globose, with an inflexed margin. *Fr. Lichenogr. p.* 405. *Schær. ! Spicil. p.* 7. Icon, *E. Bot. t.* 2474.

Alpine rocks. White Mountains, fertile. Northward to Arctic America, *Hook.* Rarely somewhat compressed.

Tribe II. ENDOCARPACEÆ, Fr.

XXIV. ENDOCARPON, Hedw.

Apothecia included in the thallus, globose; a membranaceous, thin pale thalline exciple inclosing a gelatinous, colored, deliquescent nucleus; ostioles somewhat prominent. Thallus horizontal, cartilagineous-foliaceous, subpeltate.

1. E. *miniatum*, Ach. Thallus cartilagineous-coriaceous, rigid, pale-yellowish-fulvescent, becoming cinerascent and glaucous-pruinose; on the under side naked, at length somewhat rugose, fulvescent, at length black; ostioles somewhat prominent, fuscous-nigrescent. *Fr. Lichenogr. p.* 408. — *β. complicatum*, Schær.; cæspitose-polyphyllous; lobes ascendant, imbricate and complicate, cinereous; on the under side dark-fuscous. *Schær. ! Spicil. p.* 59. *Fr. l. c.*

Rocks. New York, *Halsey.* Pennsylvania, *Muhl.* Arctic America, *Rich.* — *β*, near water, New England. New York, *Halsey.* Fries

as well as Sprengel, refers E. glaucum, Ach. (North America, Ach.), to the variety *α* of the present species. I have not found this variety, but the next species is near to it.

2. E. *Muhlenbergii*, Ach. Th. cartilagineous-coriaceous, thick, from greenish-glaucous becoming fuscescent, very finely rugose and somewhat chinky; on the under side fuscous-black; ostioles convex. *Ach. Syn. p.* 101.

Rocks. North America, *Ach.* West Point, New York, *Russell!* (Cf. Ach. Syn. pp. 101, 103.)

3. E. *fluviatile*, DC. Th. cartilagineous-membranaceous, flaccid, lobed, green, becoming fuscescent when dry; lobes rounded, somewhat auriculate-lobulate, on the under side naked, reticulate-rugulose, pale-fuscous, becoming black; ostioles somewhat prominent, black. *Fr.! Lichenogr. p.* 409. *E. miniatum, γ. aquaticum, Schær.! Spicil. p.* 60. *E. Weberi, Ach.* — *β. fulvo-fuscum*, Tuckerm.; th. thick, subcoriaceous, submonophyllous, with auriculate-lobulate, somewhat inflexed margins, fuscous-fulvescent; on the under side reticulate-rugose, dark-fulvous-fuscous becoming black; ostioles scarcely prominent, dark-reddish nigrescent.

Rocks (granite), suffused with water; New England. New York, *Halsey.* Newfoundland, *Pylaie.* — *β*, alpine. Lake of the Clouds, White Mountains, at an elevation of five thousand feet. Fries remarks, in comparing the present species with E. miniatum, *α*, that monophyllous specimens of the former are always minute; but in *β* these occur nearly as large as average specimens of the latter. The very brief indication given by Persoon (Act. Wetterav.) of his E. Americanum answers to our variety.

4. E. *pusillum*, Hedw. Th. cartilagineous, squamulose-foliaceous, smooth, brownish-olivaceous, pale on the under side, arising from a black, fibrillose hypothallus; ostioles black, somewhat prominent, pertuse. *Fr. Lichenogr. p.* 411. *E. Hedwigii, Ach., & E. lachneum & squamulosum, Ach.* (*e Fr.*).

On the earth, and rocks, especially of the more recent formations. Pennsylvania, *Muhl.* New York, *Halsey.* Apparently wanting in the granite region of New England.

5. E. *lætevirens*, Turn. Th. thin, membranaceous, irregularly orbicular, somewhat concave, round-lobed, grass-green, margins very entire,

inflexed, the under side white at the edges. *E. viride*, *Ach. Verruca-ria lætevirens*, *Borr. in E. Bot. Suppl. t.* 2658.

On the earth in alpine districts. White Mountains. Arctic America, *Rich.* The apothecia are unknown, and the plant is a very doubtful member of the present genus. Fries regards it a metamorphosis of the squamules of Cladonia.

XXV. SAGEDIA, Ach., Fr.

Apothecia included in the thallus, globose; nucleus gelatinous, deliquescent, and, as well as the membranaceous, thin exciple, becoming at length blackish; ostioles discrete, attenuated into a thin neck, and dilated at the apices, pertuse. Thallus horizontal, subcrustaceous.

S. *cinerea*, Fr. Crust cinereous, at length pruinose, somewhat foliaceous at the circumference; on the under side spongy, black; ostioles superficial, spheroidal. *Fr. Lichenogr. p.* 413. *Endocarpon*, *Pers. E. tephroides*, *α & β*, *Ach. Syn.*

(On the earth. Fr.) New York (rocks), *Halsey.* We have perhaps a Sagedia, on rocks, in New England.

XXVI. PERTUSARIA, DC.

Apothecia verrucæform, formed from the thallus, including (1—00) naked, waxy-gelatinous, colored nuclei. Thallus crustaceous, often passing into soredia and isidia.

1. P. *pertusa*, Ach. (sub Porina). Crust cartilagineous, glaucous-white; apothecia depressed-hemispherical, irregular; ostioles depressed, discrete, the perfect ones black-papillate. *Fr. Lichenogr. p.* 420. *Porina pertusa*, *Ach. Lichen pertusus*, *L. Pertusaria communis*, *DC.* — * *sorediifera;* crust sterile, sorediiferous. *Fr. l. c. Variolaria*, *Ach.* — ** *coccodes;* crust isidioid, papillose-ramulose. *Fr. l. c. Isidium coccodes*, *Ach.* — *β. areolata*, Fr.; crust thicker, rimose-areolate, verrucose, often sterile and sorediiferous. *Fr. l. c. Variolaria Flotowiana*, *Floerk.!* — *γ. leucostoma*, Fr.; apothecia with white ostioles, the black papillæ deficient. *Fr. l. c. Porina leucostoma*, *Ach.* — *δ. leioplaca*, Fr.; crust very smooth; apothecia imperfect, chinky-dehiscent. *Fr. l. c. Porina leioplaca*, *Ach.*

Trunks and dead wood; — *β*, stones; New England. New York (*α*, *γ*, and *δ*), *Halsey.* Pennsylvania (*α* and *δ*), *Muhl.*

2. P. *faginea*. Cr. tartareous-cartilagineous, cinereous-white, the circumference zonate, often thin, polished, and somewhat bluish; apoth. hemispherical, bursting into mealy soredia. *Lichen fagineus, L. & Auct.* (e *Fr.*). *Variolaria multipuncta, Turn. in Linn. Trans.* 9, *p.* 137, *t.* 10, *f.* 1. *V. faginea, Floerk.! P. sorediata, Fr.* — *β. orbiculata;* apoth. lax, explanate; the nuclei expanded into a submembranaceous, denudate, flesh-colored disk, which at length falls out, leaving the sorediiform verrucæ. *P. communis, β. sorediata, c. orbiculata, Fr. Lichenogr. p.* 422. *Variolaria faginea, communis, & corallina, Auct. var.*

Trunks, dead wood, rocks, and stones; New England and westward. New York, *Torrey*. Pennsylvania, *Muhl*. Arctic America, *Rich*. The Variolariæ have been illustrated most largely by Turner and Borrer, in the Lichenographia Britannica, and by the first-mentioned author in the Linnæan Transactions. That they are sorediferous states of various crustaceous Lichens has been shown at great length by Meyer, Wallroth, and Fries, and this view is confirmed by the observations of Eschweiler and of Schærer. To the present species, and the last, most of our common Variolariæ are to be referred.

3. P. *papillata*, Ach. (sub Porina). Cr. smooth, chinky, whitish; apoth. convex, hemispherical; ostiole solitary, elevated, papillæform, with a rufescent pore. *Ach. Syn. p.* 111.

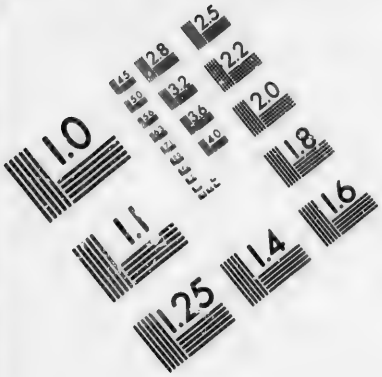
Trunks. New England. Pennsylvania, *Muhl.*

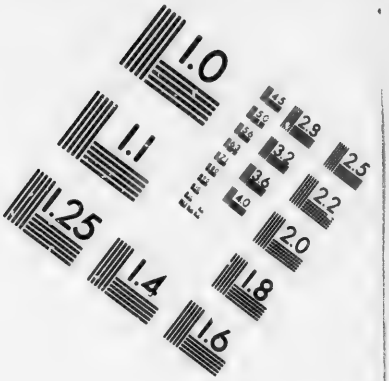
4. P. *globularis*, Ach. (sub Porina). Cr. of very numerous, subglobose, and ramulose, glaucescent granules; apoth. (infrequent) globose, smooth, with a solitary, impressed, punctiform, black ostiole. *Ach. Syn. p.* 112.

Upon mosses, Pennsylvania, *Muhl., Ach.*

5. P. *hymenia*. Cr. cartilagineous, pale-sulphureous or grayish, bordered by a black line; apoth. hemispherical-depressed, with a solitary, depressed ostiole, or more often dehiscent, marginate, and somewhat scutelliform, the discoid centre black-dotted. *Turn. & Borr. Lich. Brit. p.* 185, *sub Thelotr. Lichen hymenius, Ach. Prodr.* • *P. Wulfenii, DC. Fr. Lichenogr. p.* 424. *Porina fallax, Ach. Syn.*

Trunks. New England. New York, *Halsey*. Pennsylvania, *Muhl.*





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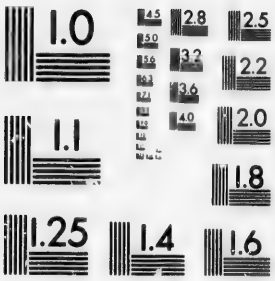

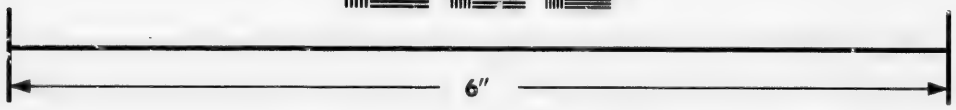

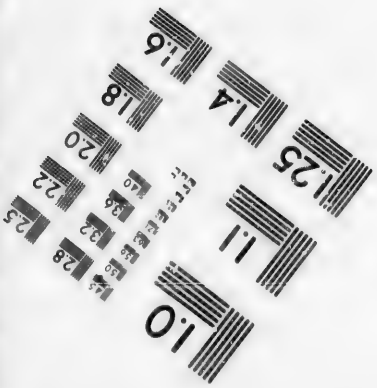

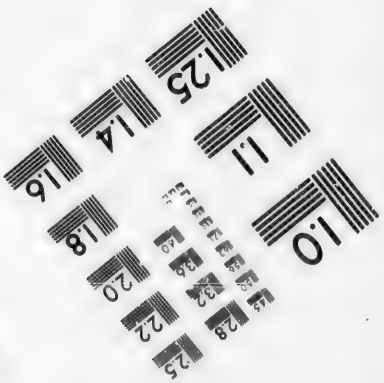

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Tribe III. VERRUCARIACEÆ, Fr.

XXVII. CONOTRÉMA, Tuckerm.

Perithecia mostly solitary, horny, black, at first pertuse, becoming at length open, with a coarctate, inflexed margin, including a depressed nucleus, which is elevated at the centre into a somewhat marginate disk. Thallus crustaceous.

C. *urceolatum*, Tuckerm. Crust thin, smooth, rugose-rimose, glaucous-white, bordered by a black line; perithecia scattered, at first covered by the crust, finally superficial, conoidal, white-pruinose. *Lecidea urceolata*, *Ach. Lichenogr. p.* 671. *Ach. Syn. p.* 27. *Pyrenula enteroleuca*, *Spreng. in Hals. Lich. N. Y. l. c. Thelotrema enteroleuca*, *Schwein. in Hals. l. c. Verrucaria enteroleuca*, *Spreng. Syst.* 4, *p.* 243. *Tuckerm. Lich. N. E. l. c.* Icon, *Hals. l. c. t.* 1, *f.* 1.

Trunks. North America, *Swartz.* (ex Ach.). Pennsylvania, *Muhl.* in herb. Willd.! New York, *Halsey.* New England, very common. Probably the Lecanora urceolata of Muhl. Catal., but the above-cited specimen in the herbarium of Willdenow is without name. The Lichen appears to me an aberrant form of the present tribe. Thelotrema? atratum, Feé Crypt. Exot. t. 13, f. 4, seems to be distinguished from Thelotrema precisely as the present genus (passing over the other essential differences) is, by its black proper exciple, but the structure of the nucleus in the former plant removes it from ours.

XXVIII. VERRUCARIA, Pers.

Perithecia hemispherical-globose, solitary, horny, black, closed with a simple or papillæform ostiole; becoming sometimes at length subscutelliform, or rarely inclosed in a thalline verruca. Nucleus gelatinous, hyaline, deliquescent. Thallus crustaceous.

* *Saxicolæ.* Crust somewhat tartareous.

1. V. *rupestris*, Schrad. Crust tartareous-compact, contiguous, whitish; perithecia (small) entire, globose, somewhat sunk, umbonate with the naked ostiole, at length collapsing and scutelliform; nucleus hyaline. *Fr. Lichenogr. p.* 436. *Hook. Br. Fl.* 2, *p.* 152. *V. Schraderi Ach.* Icon, *E. Bot. t.* 1711, *f.* 2.

Rocks and stones (limestone). Pennsylvania, *Muhl.*

2. V. *elæóchroa*, Tuckerm. Cr. applanate, rimose-areolate, olivaceous; perith. with a wide base, globose, emerging and conical at the apex, becoming at length depressed and umbilicate.

Rocks (limestone), Ohio, *Mr. Lea!* Apparently related to V. elæina, Borr. (E. Bot. Suppl. t. 2623, f. 2), and V. olivacea, Fr. (Lichenogr. p. 438), but very different from V. olivacea, Pers. (Borr. l. c. t. 2596, f. 1), which is a bark-Lichen.

3. V. *vigrescens*, Pers. Cr. somewhat gelatinous-tartareous, chinky, fuscous-nigrescent, within white; perith. entire, globose, covered by the crust and verrucose-prominent, subpapillate; nucleus whitish. *Fr. Lichenogr. p.* 438.

Rocks and stones (limestone), New England. New York, *Halsey.*

4. V. *umbrina*, Wahl. Cr. verrucose-granulate, or smoothish, from fuscescent at length dark-brown; perith. entire, globose, somewhat prominent above the crust, papillate. *Fr. Lichenogr. p.* 441.

Rocks and stones (granite), near water; New England. We have doubtless other saxicoline species, but they occur often in imperfect states, and are easily overlooked. I have an alpine Verrucaria, with large perithecia, from the White Mountains, but the crust is deficient.

** *Corticolæ.* Crust innate in the matrix, often deficient.

5. V. *nitida*, Schrad. Cr. innate in the matrix, smooth, greenish, olivaceous, or fuscous; perith. entire, covered, becoming at length somewhat prominent, persistent, ostioles subpapillate; nucleus fluxile. *Fr. Lichenogr. p.* 443. *Borr. in E. Bot. Suppl. t.* 2607, *f.* 1.

Trunks; the hue varying with the different epidermis of the matrix; New England. Pennsylvania, *Muhl.* V. composita, Schwein. in Hals. Lich. N. Y. l. c. p. 9, has apothecia clustered, forming dark spots, but I have not been able to find in my specimens, which agree apparently with the description, any constant characters to separate it from the present.

6. V. *alba*, Schrad. Cr. innate in the matrix, becoming at length denudate, white; perith. subglobose, entire, denudate, persistent, immersed at the base, ostiole papillate, or pertuse. *Fr. Lichenogr. p.* 444. — *β*; cartilagineous, smoothish; perith. smaller. *Fr. l. c. V. glabra, Ach.*

Trunks. New England. Perithecia prominent.

7. V. *gemmata*, Ach. Cr. innate in the matrix, effuse, smoothish,

white-hoary; perith. hemispherical, dimidiate (not immersed at the base), persistent; nucleus whitish. *Fr. Lichenogr. p.* 444.

Trunks. New England. New York, *Halsey.*

8. V. *epidermidis*, Fr. Cr. innate in the matrix or obsolete; perith. dimidiate, the base patent, innate-superficial, at length collapsing, and together with the nucleus, applanate-depressed. *Fr. Lichenogr. p.* 447. — *α*; perith. larger, orbiculate. *Fr. l. c. V. analepta, Ach.* — *β*; perith. larger, elliptical. *Fr. l. c. V. Cerasi & epidermidis, Ach.* — *γ*; perith. small, punctiform (with the habit of the next species). *Fr. l. c. V. stigmatella, Ach. part.*

Trunks, mostly on smooth bark; New England, and westward New York (*α* and *β*), *Halsey.* Arctic America, *Rich.*

9. V. *punctiformis*, Pers. Cr. innate in the matrix or obsolete; perith. innate-superficial, semiglobose, subdimidiate, the base inflexed; nucleus globose. *Fr. Lichenogr. p.* 447. *V. stigmatella, Ach. part.*

Trunks on smooth bark; New England. New York, *Torrey.* Pennsylvania, *Muhl.* Arctic America, *Rich.*

10. V. *pulla*, Ach. Cr. smoothish, blackish-fuscous; perith. minute, hemispherical, glabrous, subpapillate, black within. *Ach. Syn. p.* 88.

Bark of Dirca palustris, *Ach.*, who compares it with V. carpinea, which is referred to the last species by Fries.

Tribe IV. LIMBORIACEÆ, Fr.

XXIX. PYRENOTHEA, Fr.

Perithecia round, carbonaceous, closed, pertuse at length with a simple ostiole, and protruding the somewhat gelatinous, bursting nucleus; finally dehiscent, explanate, and empty. (A disciferous state occurs in a single species.) Thallus crustaceous.

P. *leucocephala*, Fr. Crust smooth, glaucescent; perithecia subglobose, naked, black, coronate with the white, persistent, globuliform nucleus. *Fr. Lichenogr. p.* 450. — *β. Lecidina*, Fr.; crust somewhat leprous; disk dilated-scutelliform, rigescent, covered for the most part with a dense pale-yellowish-cinereous bloom. *Fr. l. c. Lecidea abietina, Ach.*

Trunks (*β*), Arctic America, *Rich.*

COLLEMACEÆ.

Filamentous, or foliaceous gelatinous-conglutinate plants without discrete layers. Sporidia included in asci, and immersed in a thalamium, which is contained either in a thalline exciple or a proper exciple.

Several genera are included here formerly referred to Lichenes, but separated by Fries, and with other genera constituted a distinct family, intermediate between Lichenes and aquatic Algæ. Collema and Leptogium may be said to have the thallus of Phyceæ with the apothecia of Lichenes, and Ephebe is considered by Fries nearly related to the Byssi.

Synopsis.

Tribe I. COLLEMEÆ, Fr. — Thallus gelatinous-conglutinate, caulescent or foliaceous.

1. Collema. Apothecia scuteiliform, with a thalline exciple.
2. Leptogium. Apothecia scutelliform, with a proper exciple.

Tribe II. EPHEBIDEÆ. — Thallus filamentous, not gelatinous.

3. Ephebe. Apothecia scutelliform, with a thalline exciple.

Tribe I. COLLEMEÆ, Fr.

I. COLLEMA, Hoffm.

Apothecia at first subglobose, becoming at length discoid-open and scutelliform, with a thalline exciple. Thallus corneous-gelatinous, somewhat pulpy, of a moniliform-filamentous texture, variously lobed.

* Thallus imbricate-plicate, becoming thick and turgid when wet.

1. C. *pulposum*, Ach. Thallus thick, suborbicular, very compact, blackish-green, of numerous, somewhat imbricate, plicate, rather entire or repand-crenate, erectish lobes, those of the circumference larger, somewhat appressed; apothecia somewhat crowded, slightly concave, sulfous, with an elevated, irregular margin. *Ach. Syn. p.* 311. *Schær.!*

Spicil. 2, *p.* 538 (*sub Parmelia*). *C. cristatum*, *Borr. in Hook. Br. Fl.* 2, *p.* 208. Icon, *Wulf. in Jacq. Coll.* 3, *p.* 139, *t.* 12, *f.* 1.

Upon rocks, among mosses. Pennsylvania, *Muhl.* I have not observed this species in the granite region of New England.

2. C. *plicatile*, Ach. Th. thick, orbicular, black-green; lobes rugose-plicate, ascending, laciniate; apoth. concave, of nearly the same color with the thallus, with a thick, elevated margin. *Ach. Syn. p.* 314. *Hook. Br. Fl.* 2, *p.* 209. *Schær. Spicil.* 2, *p.* 543 (*sub Parmelia*). Exs. *Schleich.! Lich. Helv.*

Rocks (limestone, Schær.), New York, *Russell!* I have seen only a small fragment, but it appears to belong to this rather than to the preceding species.

3. C. *tenax*, Ach. Th. rather thick, suborbicular, glaucous-green, of somewhat plane, rounded, cut, or crenate lobes; apoth. scattered, at first urceolate, becoming rather elevated, concave, rufescent, with a somewhat entire margin. *Ach. Syn. p.* 314. — *β. pallescens*, Ach. th. yellow-virescent, pale beneath, the lobes irregular, densely complicated, irregularly crenate, ascending; apoth. submarginal. *Ach. l. c.*

Rocks among mosses, Pennsylvania, *Muhl.!* New York, *Spreng.* The cited specimens belong probably to the variety *β* of Acharius, but were not considered to differ from *α* by Floerke.

4. C. *fasciculare*, Ach. Th. suborbicular, imbricate-plicate, olive-green, the lobes dilated upward, waved, those of the circumference rounded, cut-crenate; apoth. marginal, at length elevated-subpedicellate, fasciculate, the disk somewhat convex, rufous. *Ach. Syn. p.* 317. *Fr.! Lich. Suec.* 50. Icon, *E. Bot. t.* 1162.

Trunks and rocks, New England. Pennsylvania, *Muhl.*

5. C. *pustulatum*, Ach. Th. substellate, lacerate-laciniate, the laciniæ expanded, plane, irregularly crenate, besprinkled above with pale pustules which pass at length into apothecia; disk punctiform, black. *Ach. Syn. p.* 351. *Parmelia leucoderma*, *Willd. herb.?*

Upon mosses, North America, *Ach.*, who says it is a minute species very distinct from the last. Pennsylvania (P. leucoderma, Willd.) *Muhl.!*

6. C. *granulatum*, Hook. Th. foliaceous, membranaceous, corrugated, granulated on both sides, imbricate-complicate, blackish-olive, the lobes somewhat rounded, waved and crisped, rather entire; apoth.

scattered, sessile, blackish-fuscous, margin entire. *Hook. Br. Fl. p.* 2, 211. *Lichen granulatus*, *Huds.* (*e Hook.*). *Collema furvum*, *Ach.* Exs. *Schær. ! Lich. Helv.* 413, 414. Icon, *E. Bot. t.* 1757.

Stones and trunks. New England. New York, *Halsey*. Pennsylvania ? *Muhl.*

** Thallus thin, foliaceous, gelatinous-membranaceous, lobed principally at the circumference.

7. C. *melænum*, Ach. Th. foliaceous, somewhat stellate, blackish-green, the lobes elongated, radiant, multifid, with elevated, waved and crisped, crenate margins ; apoth. submarginal, somewhat plane, at length rufescent, with a subgranulate margin. *Ach. ! Syn. p.* 315. — *β. jacobæifolium*, Ach. ; laciniæ narrow, strict, lacerate-pinnatifid ; apoth. marginal, with an entire margin. *Ach. l. c.* Exs. *Schær. ! Lich. Helv.* 422.

Rocks among mosses and trunks. New England.

8. C. *palmatum*, Ach. Th. cæspitose-pulvinate, brownish-green, of crowded, erectish, palmate-divided, somewhat linear and terete laciniæ ; apoth. rufous-fuscous. *Ach. Syn. p.* 319.

On the earth, and trunks. Pennsylvania, *Muhl.*

9. C. *nigrescens*, Ach. Th. somewhat monophyllous, membranaceous, expanded, round-lobed, rugose-plicate, olivaceous-nigrescent ; costate-lacunose beneath ; apoth. (minute) central, crowded, at length convex, rufous-fuscous, with a very entire margin. *Ach. Syn. p.* 321. *Hook. Br. Fl.* 2, *p.* 211. Exs. *Schær. ! Lich. Helv.* 410.

Rocks and trunks. New England. New York, *Halsey*. Pennsylvania, *Muhl.*

10. C. *flaccidum*, Ach. Th. foliaceous, membranaceous, smooth, flaccid, blackish-green ; lobes somewhat ascending, rounded, rather entire, undulate-plicate ; apoth. scattered (small), somewhat plane, rufous. *Ach. Syn. p.* 322. *Hook. Br. Fl.* 2, *p.* 211. Exs. *Schær. ! Lich. Helv.* 412.

Rocks and trunks. New England.

11. C. *tunæforme*, Ach. Th. foliaceous, membranaceous, somewhat rugose, blackish-green, besprinkled with fuliginous powder ; lobes oblong, deeply cut, sinuate-laciniate, obtuse, flexuous, crisped, subcrenate ; apoth. scattered, somewhat plane, fuscous, with a very entire margin. *Ach. Syn. p.* 322.

Rocks (especially limestone, Ach.). Pennsylvania, *Muhl.* in herb. Willd.! The specimen appeared to me to agree with an original one from Acharius. Schærer refers the species to C. flaccidum. It is said to occur in Massachusetts.

12. C. *pulchellum*, Ach. Th. membranaceous, orbicular, plane, somewhat laciniate, round-lobed at the circumference, plicate-papulose and dark-green above, beneath paler and deeply lacunose; apoth. crowded, elevated, the disk urceolate, pale, the margin thin, coarctate, very entire, at length somewhat rugulose. *Ach. Syn. p.* 321.

Trunks and rocks, New England. Pennsylvania, *Muhl.!* Ohio, *Mx. Lea!*

13. C. *saturninum*, Ach. Th. rosulate, blackish-green, glaucous and subtomentose beneath, the lobes broad, oblong, rounded, waved, very entire; apoth. scattered, somewhat plane, rufous, with a thin, entire margin. *Ach. Syn. p.* 320. *Hook. Br. Fl.* 2, *p.* 211. Exs. *Schær. Helv.* 423.

Trunks and stones. New England. Arctic America, *Rich.* I have omitted several species of this genus, which require more observation.

II. LEPTOGIUM, Fr.

Apothecia rounded, becoming discoid-open and scutelliform, somewhat pedicellate, with a proper exciple. Thallus gelatinous-membranaceous, subdiaphanous, texture cellulose.

1. L. *Tremelloides*, Fr. Thallus foliaceous, membranaceous, very thin and somewhat diaphanous, smooth on both sides, or powdery above, lead-colored; lobes oblong, rounded, very entire; apothecia scattered, elevated, plane, rufous-fuscous, with a paler margin. *Fr. Fl. Scan. p.* 293. *Collema*, *Ach. Hook. Br. Fl.* 2, *p.* 213.

Rocks and trunks, New England. New York, *Torrey.* Pennsylvania, *Muhl.*

2. L. *lacerum*, Fr. Th. foliaceous, membranaceous, very thin and somewhat diaphanous, glaucous-fuscescent, the lobes small, subimbricate, lacerate-laciniate, denticulate-ciliate; apoth. (small) scattered, subsessile, somewhat concave, rufous, with a paler margin. *Fr.! Fl. Scan. p.* 293. *Collema*, *Ach. Hook. Br. Fl.* 2, *p.* 213.

On the earth, and rocks, among mosses. New England. New York, *Halsey.* Pennsylvania, *Muhl.*

3. L. *Burgessii*, Fr. Th. membranaceous, subimbricate, glaucous-fuscescent, somewhat spongy and downy beneath, the lobes rounded, sinuate-laciniate, crisped and minutely lacerate-dentate at the margins; apoth. depressed; disk somewhat concave, fuscous, with an elevated, lacerate-dentate or foliose margin. *Collema, Ach. Syn. p.* 320. *Hook.! Br. Fl.* 2, *p.* 211. Icon, *E. Bot. t.* 300.

Trunks. Mountains of New England.

Tribe II. EPHEBIDEÆ.

III. EPHEBE, Fr.

Apothecia formed from the thallus, from concave becoming plane, and at length convex, black, the margin evanescent. Thallus filamentous, not gelatinous.

E. *pubescens*, Fr. Thallus decumbent, softish, terete, black, the branches entangled, capillaceous; apothecia of the same color. *Fr. Fl. Scan. p.* 294. *Cornicularia, Ach.* — *β. fibrillosa*, Ach.; thallus obscurely fuscous, smoothish, very delicate, branched, somewhat hirsute with numerous, flexuous, branched, subclavate fibres. *Cornicularia pubescens, var. fibrillosa, Ach. Syn. p.* 302.

Rocks and stones; — *α*, in alpine districts. Greenland, *Dill.* White Mountains. — *β*, North America, *Ach.*